عنوان مقاله:

Genetic Variation in Response to Global Warming in a Coral Reef Species, Porites lobata

محل انتشار:

مهندسی بهداشت محیط, دوره 7, شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

Climate change due to global warming is one of the worst environmental disasters in the world, which affects all ecosystems and has led to increasing degradation of coral reefs. The increase of sea surface temperature is inversely related to the resistance of corals and is directly associated with their bleaching. High temperature disrupts the symbiotic relationship between coral and algal symbiont and results in coral bleaching. To evaluate the adaptation of corals to heat stress, in this study, we investigated the thermal stress effect on the expression of genes involved in programmed cell death (PCD), cysteinyl aspartate proteases ۳ (will be mentioned as Caspas۳ hereafter) and anti-apoptotic pathway, B-cell lymphoma ۲ (will be mentioned as Bcl۲ hereafter) in Porites lobata (Dana, ۱۸۴۶). Corals were incubated at ۲۵°C for ۲ weeks (adaptation period) and then exposed to ۳۴°C (heat shock) for ۲۴ and ۴۸ hours. Then, the expression of genes was measured using real-time PCR. The results revealed that both genes were up-regulated at ۲۴ hours after heat induction. Bcl-۲ expression (anti-apoptotic gene) was induced at ۲۴ hours and was down-regulated at ۴۸ hours. In contrast, Caspase۳ (apoptotic gene) continued to be expressed up to ۴۸ hours. These results might indicate that coral cells are headed towards bleaching and death with increased temperature. The results of this study, regarding the observed expression patterns, can clarify the response of different genes to a thermal stress in coral reefs. The exposure of corals to acute conditions with high temperatures presented the behavior of the desired genes in the studied conditions.

کلمات کلیدی:
Environmental deterioration, Apoptosis, Bcl-۲, Caspase۳, Real-time PCR, Thermal stress, Global change