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Commentary

Effect of Global Warming and Acidification on Bioaccumulation in *Pinctada radiata*

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ABOUT THE STUDY

Warming and acidification are expected to be affected by climate change, which will affect the marine area in the future. These areas are also vulnerable to strong human pressure such as chemical pollutants. However, the results of both marine ecosystem and biological stressors have not yet been identified. The purpose of this study is to investigate for the first time the effect of increased temperature and CO_2 pressure on the bioaccumulation of the phenanthrene PAH model in the four tissues of the commercially important pearl oyster *Pinctada radiata*, gill, digestive gland, muscle and mantle. Oysters were exposed to various combinations of ambient temperature and pH currently measured in the Persian Gulf, expected ocean warming and acidification, and correct PhE concentrations for 28 days.

At all exposures, higher PhE levels were observed in the gastrointestinal glands and gills with hypercapnia and warming, followed by mantle and muscle. In general, the longer exposure periods led to increased PhE bioaccumulation in all tissues under ocean warming and acidification. It was a time-dependent pattern of PhE accumulation in *P.radiata*. PhE concentrations in today's environment, combined with marine warming and acidification, can lead to severe destruction of physiological functions and can further threaten the ecological fitness of pearl oysters. Especially since the mid-20th century, significant increases in human impact on the planet, including continued population growth, extreme use of natural resources and overproduction of pollutants, have caused climate change.

The effects of pollutants and their uptake are virtually altered by lower pH values or higher temperatures, and vice versa. Studies on pH are extremely rare for the bioaccumulation of PAHs that are also affected by temperature, and this report seems to have shown for the first time the effect of pH on the bioaccumulation of PAHs in relation to temperature. However, the antagonistic and synergistic effects of lower pH-related temperature increases on the bioaccumulation of some heavy metals such as cadmium and mercury in aquatic organisms have been identified. To gain new insights into the interaction of low pH and high temperatures with organic pollutants, this study investigated whether different combinations of pH and temperature affect the PAH accumulation of the pearl oyster *Pinctada radiata*. This species, which is widespread throughout the Persian Gulf, has been considered a commercial species.

Climate change that occurs after 50-100 years and can be achieved using phenanthrene as a pollutant model can affect the bioaccumulation levels of PhE in oyster soft tissues and pollutants. Confirm that the accumulation of is affected by the rise in temperature and PCO_2. In oyster tissues, significant accumulation of PhE was shown to be isolated and combined in marine organisms, at least in part, affected by increased metabolic activity and modulation under elevated seawater temperature and PCO_2. In particular, changes in bioaccumulation appeared to depend on the duration of PhE exposure and experimental conditions. Therefore, the intake of components such as PhE can vary in some ways.

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