

アワビ類2種の殻・軟体部成長、貝殻の安定同位体組成への海洋酸性化影響

Effects of ocean acidification on shell and somatic growth, and stable isotopes of shell carbonate of two species of abalones

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Ocean acidification is now one of the important issue to appreciate the impact on marine calcifiers (IPCC, 2013), and potentially affects their survival, calcification, growth, physiology and development. To evaluate the effects of elevated CO₂ levels on shell and somatic growth, and stable isotope compositions of two species of abalones (*Haliotis discus discus*, *Haliotis gigantea*), we conducted culture experiments at three treatment levels of seawater pCO₂ (400, 750, and 1200 μatm), at approximately 23 °C.

The effects of seawater pH on calcification (shell width, shell weight) was non-significant in both species. On the other hand, the positive relationships between pH and wet weight of soft tissue of two species were observed. Their adjusted wet weight of soft tissue at 1200 μatm was significantly greater than that at 400 μatm. These results suggest that elevated pCO₂ affected their metabolism (e.g. higher metabolic rates to maintain homeostasis).

Stable oxygen isotope compositions of outer (calcite) and inner (aragonite) shell layers of two species showed non-significant relationships with pH. The negative correlations between carbon isotope compositions and pH of both layers appeared in both species, and the slopes of these relationships of shells were lower than that of dissolved inorganic carbon (DIC) of seawater. We estimated the equilibrium values of carbon isotope compositions at each pCO₂ treatment, and the difference between the carbon isotope compositions of shell and equilibrium values showed gradual increases in shell carbon isotope compositions with decreasing pH. Thus, the pCO₂-induced change in metabolism of abalones might appear in carbon isotope compositions of shells as the metabolic effect.

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