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Influence of bacteria on shell dissolution in dead gastropod larvae and adult *Limacina helicina* pteropods under ocean acidification conditions

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ABSTRACT

Ocean acidification (OA) increases aragonite shell dissolution in calcifying marine organisms. It has been proposed that bacteria associated with molluscan shell surfaces in situ could damage the periostracum and reduce its protective function against shell dissolution. However, the influence of bacteria on shell dissolution under OA conditions is unknown. In this study, dissolution in dead shells from gastropod larvae and adult pteropods (*Limacina helicina*) was examined following a 5-day incubation under a range of aragonite saturation states (Ω_{arag}; values ranging from 0.5 to 1.8) both with and without antibiotics. Gastropod and pteropod specimens were collected from Puget Sound, Washington (48°33′19″N, 122°59′49″W and 47°41′11″N, 122°25′23″W, respectively), preserved, stored, and then treated in August 2015. Environmental scanning electron microscopy (ESEM) was used to determine the severity and extent of dissolution, which was scored as mild, severe, or summed (mild + severe) dissolution. Shell dissolution increased with decreasing Ω_{arag}. In gastropod larvae, there was a significant interaction between the effects of antibiotics and Ω_{arag} on severe dissolution, indicating that microbes could mediate certain types of dissolution among shells under low Ω_{arag}. In *L. helicina*, there were no significant interactions between the effects of antibiotics and Ω_{arag} on dissolution. These findings suggest that bacteria may differentially influence the response of some groups of shelled planktonic gastropods to OA conditions. This is the first assessment of the microbial–chemical coupling of dissolution in shells of either gastropod larvae or adult *L. helicina* under OA..

Full Text

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