

MASTER'S THESIS

Interactive effects of hypoxia and ocean acidification on biofilms and the subsequent effects on the larval settlement of the marine invertebrate *Crepidiula onyx*

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Abstract

Hypoxia and ocean acidification (OA) are amongst the major environmental threats to marine ecosystems worldwide. Biofilms, the signpost to guide larval settlement of many benthic invertebrates, are known to be responsive to environmental changes and thus can become the crucial factor for the response of benthic invertebrate communities. This study aimed at investigating the individual and interactive effects of hypoxia and OA on biofilms and the subsequent effects on larval settlement. Biofilms collected from two sites (clean, hypoxic) were treated with a factorial design of low dissolved oxygen and/or low pH conditions in microcosms and the bacterial cell density and viability (by LIVE/DEAD® cell viability assays) were analyzed. Larval settlement preference was tested with the marine invertebrate, *Crepidula onyx*.

The total bacterial cell densities of biofilms of the hypoxia and hypoxia and OA combination treatment were lower than that of the control biofilms for both sites. There was generally no significant difference in cell viability among control and different treatments for both sites. While the larval settlement rate on hypoxia and hypoxia and OA combination treated biofilms was significantly lower. In conclusion, this study revealed that hypoxia and OA are likely to affect larval settlement by alteration of biofilms, and this may lead to alterations in future coastal communities.

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