



Research review paper

Natural antifouling compounds: Effectiveness in preventing invertebrate settlement and adhesion

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ABSTRACT

Biofouling represents a major economic issue regarding maritime industries and also raise important environmental concern. International legislation is restricting the use of biocidal-based antifouling (AF) coatings, and increasing efforts have been applied in the search for environmentally friendly AF agents. A wide diversity of natural AF compounds has been described for their ability to inhibit the settlement of macrofouling species. However poor information on the specific AF targets was available before the application of different molecular approaches both on invertebrate settlement strategies and bioadhesive characterization and also on the mechanistic effects of natural AF compounds. This review focuses on the relevant information about the main invertebrate macrofouler species settlement and bioadhesive mechanisms, which might help in the understanding of the reported effects, attributed to effective and non-toxic natural AF compounds towards this macrofouling species. It also aims to contribute to the elucidation of promising biotechnological strategies in the development of natural effective environmentally friendly AF paints.

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1. Introduction

The establishment of new benthic biological communities in aquatic environments either in living or non-living substrata (biofouling)

generally involves a sequence of succession started by the accumulation of a biochemical proteinaceous conditioning followed by bacteria, unicellular and multicellular eukaryote colonization (Wahl, 1989). The initial step of microbial biofilm formation (microfouling) is known to regulate the subsequent colonization of macroalgal spores and invertebrate larvae (macrofouling) (Pawlik, 1992). Biofilm properties, including physical characteristics, biotic composition and produced chemical signals have been reported to act as either a stimulatory or inhibitory stimulus for the settlement of a particular macrofouling community

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