

Article

Acetylcholinesterase in Biofouling Species: Characterization and Mode of Action of Cyanobacteria-Derived Antifouling Agents

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Abstract: Effective and ecofriendly antifouling (AF) compounds have been arising from naturally produced chemicals. The objective of this study is to use cyanobacteria-derived agents to investigate the role of acetylcholinesterase (AChE) activity as an effect and/or mode of action of promising AF compounds, since AChE inhibitors were found to inhibit invertebrate larval settlement. To pursue this objective, *in vitro* quantification of AChE activity under the effect of several cyanobacterial strain extracts as potential AF agents was performed along with *in vivo* AF (anti-settlement) screening tests. Pre-characterization of different cholinesterases (ChEs) forms present in selected tissues of important biofouling species was performed to confirm the predominance of AChE, and an *in vitro* AF test using pure AChE activity was developed. Eighteen cyanobacteria strains were tested as source of potential AF and AChE inhibitor agents. Results showed effectiveness in selecting promising eco-friendly AF agents, allowing the understanding of the AF biochemical mode of action induced by different compounds. This study also highlights the potential of cyanobacteria as source of AF agents towards invertebrate macrofouling species.