

Type 2 Quorum Sensing Monitoring, Inhibition and Biofilm Formation in Marine Microorganisms

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Abstract

The quorum sensing (QS) dependent behaviour of micro-organisms, in particular expression of virulence genes, biofilm formation and dispersal, have provided impetus for investigating practical approaches to interfere with microbial QS. This study tests *Halomonas pacifica* and *Marinobacter hydrocarbonoclasticus*, two halophilic marine micro-organism, for their AI-2 dependent QS signalling and the effect of two well-known quorum-sensing inhibitors (QSIs), patulin and penicillic acid, on biofilm formation. We report, for the first time, the successful amplification of a putative *luxS* gene in *H. pacifica* using degenerated primers and AI-2 dependent QS as well as inhibition using QSIs. Penicillic acid had a strong inhibitory effect on AI-2 induction of *H. pacifica* at non-growth inhibitory concentrations, while patulin has an adverse effect only at the highest concentration (25 μ M). QSIs effect on biofilm forming capability was isolate specific, with maximum inhibition at 25 μ M of patulin in *H. pacifica*. In *M. hydrocarbonoclasticus*, no adverse effects were noted at any tested concentration of either QSIs. Detection of bioluminescence and the presence of a putative *luxS* gene provide biochemical and genetic evidence for the production of a signalling molecule(s) which is the essential first step in characterizing *H. pacifica* QS. This study highlights the importance of AI-2 dependent QS in a marine setting, not previously reported. It further suggests that QSI compounds must be selected in the specific system in which they are to function, and they cannot easily be transferred from one QS system to another.

Citation:

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