

## Quorum Quenching Activities of Bacteria Isolated from Red Sea Sediments

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**Abstract :** Quorum sensing (QS) is the process by which bacteria communicate with each other through small signaling molecules, such as N-acylhomoserine lactones (AHLs). Also, certain bacteria have the ability to degrade AHL molecules by a process referred to as quorum quenching (QQ); therefore, QQ can be used to control bacterial infections and biofilm formation. In this study, we aimed to identify new species of bacteria with QQ activities. To achieve this, sediments from Red Sea were collected either in the close vicinity of Sea grass or from area with no vegetation. From these samples, we isolated 72 bacterial strains and tested their ability to degrade/inactivate AHL molecules. *Chromobacterium violaceum* based bioassay was used in initial screening of isolates for QQ activity. The QQ activity of the positive isolates was further confirmed and quantified by employing liquid chromatography and mass spectrometry. These analyses showed that isolated bacterial strain could degrade AHL molecules with different acyl chain length and modifications. Sequencing of 16S-rRNA genes of positive isolates revealed that they belong to three different genera. Specifically, two isolates belong to genus *Erythrobacter*, four to *Labrenzia* and one isolate belongs to *Bacterioplanes*. Time course experiment showed that isolate belonging to genus *Erythrobacter* could degrade AHLs faster than other isolates. Furthermore, these isolates were tested for their ability to inhibit formation of biofilm and degradation of 3OXO-C12 AHLs produced by *P. aeruginosa* PAO1. Our results showed that isolate VG12 is better at controlling biofilm formation. This aligns with the ability of VG12 to cause at least 10-fold reduction in the amount of different AHLs tested.

**Keywords :** quorum sensing, biofilm, quorum quenching, anti-biofouling

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