

Identification of bacterial signalling molecules

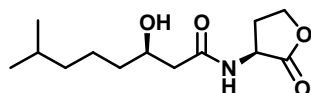
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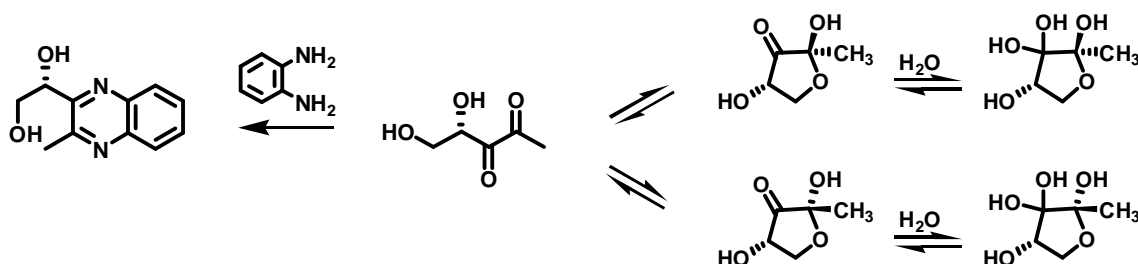
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Cell-to-cell communication is used by bacteria to coordinate their behaviour and function in a cell-density-dependent manner. This phenomenon is termed quorum sensing. In general, Gram-negative bacteria use acylated homoserine lactones (AHLs) as autoinducers. Another signalling molecule is the so called autoinducer 2, the cyclic borate diester of 4,5-dihydroxy-2,3-pentanedione (DPD).

GC-MS analysis is a successful method to detect AHLs and determine their structure. Different classes of AHLs are known, with variation in the functional group and position of the double bond in the non-branched *N*-acyl side chain. Recently, we identified methyl branched AHLs such as (*R*)-3-Hydroxy-8-methyloctanoylhomoserine lactone, using gaschromatographic retention indices, because the mass-spectra of the non-branched and branched derivatives show only small differences. The absolute configuration was determined by GC comparison on a chiral phase.



For detection and quantification of DPD in natural extracts a new method was developed, which for the first time allows its determination. Formation of a quinoxaline followed by silylation results in a derivative with good GC-MS properties, that could be detected by using ion traces of the base peak $m/z = 245$ and the molecular ion $m/z = 348$.



1 I. Wagner-Döbler, V. Thiel, L. Eberl, M. Allgaier, A. Bodor, S. Meyer, S. Ebner, A. Hennig, R. Pukall, S. Schulz, *ChemBioChem* **2005**, 6, 2195-2206.