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Utilizing the RhlR/RhlI Quorum Sensing System to Express the ß-Galactosidase Reporter Gene by Using the N-Butanoyl Homoserine Lactone and N-Hexanoyl Homoserine Lactone

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Abstract : Quorum sensing is a phenomenon present in many gram-negative bacteria that allows bacterial communication and controlled expression of a large suite of genes through quorum sensing signals - N-acyl homoserine lactones (AHLs). In order to investigate the ability of the rhlR/rhlI quorum sensing system in Pseudomonas aeruginosa to express the ß-Galactosidase reporter gene, an engineered E. coli strain EpHL02, was genetically engineered. This engineered E. coli strain EpHL02 responded to the presence of the N-butanoyl homoserine lactone and N-hexanoyl homoserine lactone to express the ß-Galactosidase reporter gene at a concentration limit of $5x10^{-8}$ M. This was also found to be comparable to AHLs extraction from Serratia marcescens H31. Moreover, we examined this ability of this engineered E. coli strain for respond of AHLs from extractions of Pseudomonas aeruginosa ATCC9027. The results demonstrated that the rhlR/rhlI quorum sensing system can express the ß-Galactosidase reporter gene by using the N-butanoyl homoserine lactone, N-hexanoyl homoserine lactone and AHLs from extractions of Serratia marcescens H31 and Pseudomonas aeruginosa ATCC9027 in the engineered E. coli strain EpHL02.

Keywords : N-butanoyl homoserine lactone, C4-HSL, N-hexanoyl homoserine lactone, C6-HSL, Pseudomonas aeruginosa, quorum sensing, Serratia marcescens, ß-galactosidase reporter gene
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