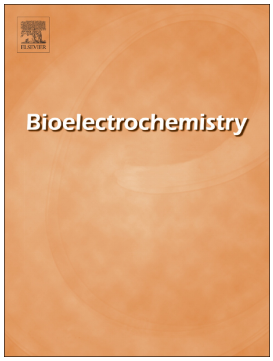

Spontaneous quorum sensing mutation modulates electroactivity of Pseudomonas aeruginosa PA14

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Spontaneous quorum sensing mutation modulates electroactivity of *Pseudomonas aeruginosa* PA14

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Abstract

Pseudomonas aeruginosa is able to interact with the anode of a bioelectrochemical system through redox active phenazines. Earlier studies showed that this interaction is strain and carbon source dependent. With a spontaneously formed *ΔlasR* mutant of *P. aeruginosa* PA14 and the wildtype, we investigated the connection between the complex quorum sensing network and current production. Depending on the carbon source, phenazine production and subsequently current generation are effected differently in these two populations. In glucose-fed cultures, the lack of the LasR regulator led to a shift in phenazine concentration, relative composition, and time profiles. In contrast, with the common fermentation product 2,3-butanediol as carbon substrate, no phenazine production was detected for the *ΔlasR* mutant. For the wildtype, this carbon source is known to induce phenazine synthesis and elevated current production. This work supports the earlier hypothesis of a signaling link between 2,3-butanediol and the quorum-sensing regulatory system and extends this hypothesis to predict a *lasR*-dependent interaction. The wildtype and mutant population were also evaluated in direct competition, showing strong initial dominance of the wildtype but a higher survival rate of the *ΔlasR* mutant in later stages of growth. We found no evidence for strong social interactions between these two subpopulations.

Keywords: Bioelectrochemical System, *Pseudomonas aeruginosa*, phenazine, LasR,