

An insight of synergy between *Pseudomonas aeruginosa* and *Klebsiella variicola* in microbial fuel cell

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ABSTRACT

The interspecies interactions in microbial communities are very complex, rendering identification of synergistic or antagonistic relationships very difficult; however, understanding the mutualistic relationship between the microbes is exigent to gain deeper insight into their performance in wastewater fed microbial fuel cells (MFCs). In the present study, we aimed to explore the ecological networks between the microorganisms in a defined coculture system comprising with *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Klebsiella variicola* (*K. variicola*). The coculture showed around 3 times higher current density in MFCs compared with either of these two bacteria alone. Metabolite analysis demonstrated that the fermentative metabolite (1,3-propanediol) produced by *K. variicola* stimulated the *P. aeruginosa* to produce a higher amount of pyocyanin through synergistic interactions, leading to the enhancement in the performance of coculture MFCs fed with palm oil mill effluent (POME). This study proves that the metabolite based “interspecies ecological communicatio” can enhance the electrochemical activity in MFCs.

Keywords: Coculture; Electron shuttling mediators; Metabolites; Microbial fuel cell; Synergistic relationship