Flavins mediate extracellular electron transfer in Gram-positive Bacillus megaterium strain LLD-1 - DTU Orbit (30/10/2017)

Flavins mediate extracellular electron transfer in Gram-positive Bacillus megaterium strain LLD-1

The extracellular electron transfer (EET) mechanism of an isolated Gram-positive Bacillus megaterium strain (LLD-1), identified by 16S rRNA gene sequencing and physiological analysis, was investigated in the present study. The electrochemical activity of strain LLD-1 was confirmed by electrochemical E-t and amperometric I-t tests. Flavins in culture suspension from strain LLD-1 were further proved to be able to act as electron shuttles, strengthening the electron transfer from LLD-1 to the electrode. The output voltage and current output were increased 2.8 times and 3.7 times, respectively, by adding 100 nM exogenetic flavins into microbial fuel cells inoculated with LLD-1. Electricity generation by LLD-1 from different carbon sources can be enhanced by adding 100 nM exogenetic flavins. This study indicated that flavins were essential to the EET process of the Gram-positive strain LLD-1. Furthermore, a putative EET model for B. megaterium strain LLD-1 and even for Gram-positive bacteria was proposed.

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