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Biodegradation of Acid Orange 7 in a combined anaerobic-aerobic up-flow membrane-less microbial fuel cell: Mechanism of biodegradation and electron transfer

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Abstract

A distinctive combination of anaerobic-aerobic in a single chambered up-flow membrane-less microbial fuel cell (UFML MFC) was developed to explore the interrelation and mechanism between Acid Orange 7 (AO7) biodegradation and bioelectricity generation. The performance of AO7 biodegradation in UFML MFC was evaluated by various operating configurations. This study demonstrated that the UFML MFC capable to sustain high decolorization efficiency throughout a long term operation. Besides, the obtained results illustrated that the AO7 decolorization would compete with exoelectrogens and other anaerobic microbial activities for electrons that released from the substrate. The decolorization efficiency of AO7 was ranging from 89% - 96% during operated in various configurations. However, the voltage output was highly affected as the AO7 dosage was increased. Therefore, these results indicated that most of the available electrons were more prone to be used by AO7 decolorization rather than

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