

## **A highly efficient single chambered up-flow membrane-less microbial fuel cell for treatment of azo dye Acid Orange 7-containing wastewater**

### **Abstract**

Single chambered up-flow membrane-less microbial fuel cell (UFML MFC) was developed to study the feasibility of the bioreactor for decolorization of Acid Orange 7 (AO7) and electricity generation simultaneously. The performance of UFML MFC was evaluated in terms of voltage output, chemical oxygen demand (COD) and color removal efficiency by varying the concentration of AO7 in synthetic wastewater. The results shown the voltage generation and COD removal efficiency decreased as the initial AO7 concentration increased; this indicates there is electron competition between anode and azo dye. Furthermore, there was a phenomenon of further decolorization at cathode region which indicates the oxygen and azo dye are both compete as electron acceptor. Based on the UV-visible spectra analysis, the breakdown of the azo bond and naphthalene compound in AO7 were confirmed. These findings show the capability of integrated UFML MFC in azo dye wastewater treatment and simultaneous electricity generation.

### **Keywords**

AO7; Decolorization; Membrane-less; MFC; Up-flow