

## Electronic Supplementary Information for RSC Advances

### Implication of Endogenous-Decay Current and Quantification of Soluble Microbial Products (SMP) in Microbial Electrolysis Cells

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#### Calculations for coulombic efficiency and H<sub>2</sub> recovery

We computed coulombic efficiency with Eq (S1).

$$\text{Coulombic efficiency} = \frac{\text{cumulative coulombs}}{\text{acetate}_{\text{ox}}} \quad \text{Eq (S1)}$$

where acetate<sub>ox</sub> is the moles of acetate oxidized in a given time (mol of electrons), cumulative coulombs are cumulative electrons transferred from acetate to an anode in a given time (mole of electrons). We converted measured coulombs with Faraday constant 96,485C = 1 mole of electrons.

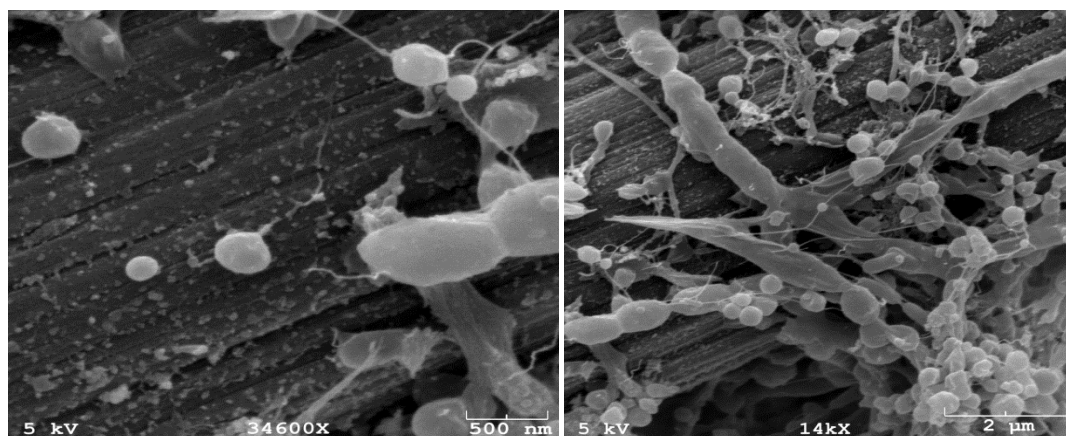
H<sub>2</sub> recovery efficiency was computed with Eq (S2)

$$H_2 \text{ recovery efficiency} = \frac{\text{obs } H_2 \text{ volume}}{\text{cumulative coulombs}} \times \frac{1 \text{ mol } H_2}{22.4 \text{ L } H_2} \times \frac{273.15 \text{ K}}{298.15 \text{ K}} \times \frac{2 \text{ mol electrons}}{\text{mol } H_2} \quad \text{Eq (S2)}$$

where obs H<sub>2</sub> volume is measured volume of hydrogen gas in a given time (L). We converted the H<sub>2</sub> volume into moles of electrons using the ideal gas law compensating for temperature effect of 25°C.

#### SEM image on biofilm anode

Figure S1 shows SEM images of biofilm on the anodes. Figure S1-(A) clearly shows microorganisms (ARB) connected to the anodes through pili-like appendages, which also linked other potential ARB. The connection of microorganisms is more evidently presented in Figure S1-(B).



(A)

(B)

Figure S1. SEM image of biofilm anode. (A) ARB connected with carbon fiber via pili-like appendages, and (B) microorganisms connection through pili-like structures.