



Confectionery wastewater treatment through upflow microbial fuel cell

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ABSTRACT

In the present study, upflow microbial fuel cell was setup for the treatment of confectionery wastewater. Upflow anaerobic sludge blanket reactor was used as anaerobic unit which was connected with aerobic units with salt bridge. For optimization of reactor startup synthetic wastewater was used for 30 d then different concentrations of confectionery wastewater were treated. Samples were analyzed for physicochemical parameters and chemical oxygen demand (COD) and Pearson's correlation matrix was applied. Biogas was collected and electricity was measured through multimeter. Total anaerobic microbial count was performed on thioglycollate media (CFU mL⁻¹) and biofilm formation was observed through scanning electron microscopy (SEM). After startup COD removal efficiency with 50% diluted wastewater was 100%. Highest voltage (982 mV), power density (0.042 W cm⁻²) and current (797 μA) were observed when 1 mL nutrients added wastewater was used. Maximum biogas 472 mL d⁻¹ production was achieved in undiluted wastewater sample. Highest anaerobic count 1.24 × 10⁴ CFU mL⁻¹ was observed when 1.5 mL nutrient added wastewater was used. SEM analysis showed biofilm formation on C anode with filamentous microbes.

Keywords: Bioelectricity; Confectionery; Microbial fuel cell; Pearson correlation; Scanning electron microscopy; Salt bridge

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