Power Generation in Microbial Fuel Cell fed with post methanation distillery effluent as a function of pH microenvironment

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Abstract

The effect of anolyte and catholyte pH on power generation in an MFC using post methanation distillery effluent (PMDE) was studied in batch mode. Higher anodic pH (7-9) and low cathodic pH (2) were more favorable and at the optimal cathode: anode pH ratio of 2:8, power density attained was 0.457 W/m^3. An initial feed solution pH up to 10 was tolerated by the MFC. However, internal resistance increased 1.5 times and power density decreased by 60% at pH 10 as compared to that at pH 7, the normal anolyte pH. Internal resistance of the MFC was minimum (266 ohms) at cathodic pH 2, thus favoring better power generation. Under low cathodic and high anodic pH ratio of the MFC, a low internal resistance favored both high current density and power density.

Keywords

MFC; Anolyte pH; Catholyte pH; Internal Resistance; Distillery Effluent.

1. Introduction

Energy resources are basic to the development of any society. For a long time fossil fuels have been used as a major source of energy. However, burning of fossil fuels leads to serious environmental pollution and CO_2 emitted in the process is mainly responsible for the climate change problem. Hence, in the recent years focus has shifted to look for newer and cleaner energy resources that integrate energy production and wastewater treatment using microbial systems (Kaushik et al., 2011).