

DIRECT CONVERSION OF SUGARCANE BAGGASE INTO BIOELECTRICITY USING BIOMASS FIXED CELL METHOD

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Abstract

The aim of these research is direct conversion of sugarcane baggase into bioelectricity using biomass fixed cell method. Biomass fixed cell was direct conversion into bioelectricity at low temperature (95 °C) and atmosphere pressure. This method using two compartements assisted by salt bridge as a charge balance. The effectiveness and efficiency of the performance biomass fixed cell into bioelectricity affected sugarcane mass, reflux time and oxidizing concentration. The research was conducted with two steps, dissolution of sugarcane baggase through reflux process and measurement of bioelectricity using biomass fixed cell method. Dissolution of sugarcane baggase was mixed sugarcane baggase and FeCl₃/HCl solution with various time of 0.3.5 and 10 h and various sugarcane baggase of 0.5 and 5 g. The results showed that the 65.55 wt % of sugarcane baggase was dissolved after 10 h on the 0.5 g mass of sugarcane baggase. Biomass solubility showed that the 44,02% decomposition by 5 g of oxidizing agent. The highest of bioelectricity measurement were obtained at 21.06 mW/m² and 395.63 mA/m² on 0.5 g 5 h. Biomass characterization measure by UV/Vis Spectrophotometer, Fourier Transform Infra Red (FTIR), Gas Chromatography-Mass Spectrometer (GC-MS) and thermal analysis (TGA/DTA).

Keyword: Bioelectricity, Reflux, Sugarcane Baggase