

ABSTRACT

The need for electrical energy in Indonesia, which is still dependent on non-renewable energy, has triggered various researches towards technology that is more effective, efficient and environmentally friendly in producing electrical energy. One of the alternative technologies is the *Sediment Microbial Fuel Cell* (SMFC) which is based on bioelectrochemical principles by utilizing microorganisms to break down the substrate to produce electrical energy. This study aims to determine the potential of electrical energy generated from variations in the volume of rice sludge substrate with molasses in the form of molasses in a reactor *single chamber* using the SMFC method with a total volume of 800 ml for each variation. The reactor is cylindrical with a height of 17 cm and a diameter of 8 cm. The electrodes used in the system are plates made from zinc (Zn) as anode and copper (Cu) as a cathode with a size of 5 cm x 5 cm. Data measurements were carried out every 2 hours for 14 days, data collection of voltage and current using a multimeter. The results of the research on the four variations of the first data measurement variations (rice field mud: molasses) where reactor 1 (200 ml: 600 ml), reactor 2 (400 ml:400 ml), reactor 3 (600 ml:200 ml), and reactor 4 (800 ml:0 ml) shows that the gain of power density in the variation of 600 ml of paddy mud and 200 ml of sugarcane produces the most optimum power density value, namely 232.97 mW/m² on the 13th day compared to three other variations whose values are not much different from one another. each other. Then in the second data measurement, the highest power density value that can be generated from each reactor is obtained, namely the variation (500 ml:300 ml) of 199.36 mW/m², variation (550 ml:250 ml) 283.02 mW/m², variation (600 ml:200 ml) 402.84 mW/m², and the variation (650 ml:150 ml) is 698.97 mW/m². Based on the results of the study, it can be concluded that the most optimum variation in producing electrical energy production in this study is reactor 8 with a volume ratio of 650 ml of rice field mud and 150 ml of molasses.

Keywords: Sediment Microbial Fuel Cell, single chamber, sugarcane molasses, mud of rice field.