

## **ABSTRACT**

*The increase in population in Indonesia every year causes an increase in the need for energy sources to be used in daily life. Indonesia is still focused on the use of resources that are not environmentally friendly which will result in environmental damage and depletion of supplies of fossil-based resources. Therefore, alternatives are needed in the form of renewable energy that is more environmentally friendly and sustainable. Microbial Fuel Cell (MFC) is an option for producing electrical energy using environmentally friendly materials. Basically, the working principle of a Microbial Fuel Cell (MFC) is that there is a chemical reaction that uses bacteria and then converts it into electrical energy using organic materials. Factors that influence the amount of electrical energy produced from this system include the size of the PEM, substrate composition, substrate volume, and incubation duration on the substrate. Proton Exchange Membrane or what is usually called PEM is a place for electron exchange between the anode and cathode spaces. The PEM in this study was made from clay that was fired at high temperatures. In this research, the organic materials used were mud and banana peel waste. The aim of this research is to prove the effect of the electricity output produced on the 3 PEM size variants used. This research is aimed at optimizing the existing system, aiming to prove the effect of PEM size variants which will produce greater electricity.*