***ABSTRACT***

*There is a strong proportional relation between population growth and energy consumption basis which could cause depletion of energy source in a short time. Fossil energy, the major source of today's energy, need to be developed or replaced by a more renewable alternative. One of the alternatives that have been used broadly is Microbial Fuel Cell. Microbial Fuel Cell uses microorganism as biocatalyst to oxidize organic and inorganic compositions with anaerobic process to generate electricity. This research intends to understand how the different materials of Microbial Fuel Cell Electrodes affect its performance. The metals to be observed are lead, zinc, and copper in a shape of plate with surface area 10* $cm^2$*. In this research, pair of electrodes either has same metals combination in both cathode and anode or different metals in cathodes and anodes. Reactor used in this research is Dual Chamber Microbial Fuel Cell, which has sodium chloride bridge between the electrodes with the concentration of 1 M. The anode is filled with mangrove mud from Cinta Muara Gembong Bridge, Bekasi, while the cathode is filled with pure* $H_2O$*. Outputs of this research are electric voltage and current value which then be calculated to get power and power density. Measurement will be done every 10 minutes in 180 minutes in the same time twice with digital multimeter, Measurements were performed every 10 minutes for 180 minutes or 3 hours with two measurements. Measurement of voltage and current as outputs is measured without the use of external resistance or called open circuit. Based on the research result that is maximum combination using zinc with copper variation, the power density value obtained is directly proportional to the value and the current strength per electrode surface area, which is* 61,39 $\frac{\mathbf{mW}}{\boldsymbol{m^2}}$ *at the first measurement 140 minutes and 56,745* $\frac{\boldsymbol{mW}}{\boldsymbol{m^2}}$ *at the second measurement of 110 minutes.*

*Keywords: Microbial Fuel Cell, electrodes, mangrove mud.*