

## ABSTRACT

Microbial Fuel Cell (MFC) is one method to generate electrical energy through the oxidation process on the substrate as fuel and bacteria as a catalyst. The STM reactor uses a double-chamber type, in which the anode compartment is filled by substrate and microorganism, while the cathode contains aquades. Both are connected by salt bridges. Four experimental reactors were prepared consisting of R7L4P1, R3L4P1, R7L1P4, and R3L1P1 (R = substrate time, 3 and 7 days L = mud volume, 100 ml and 400 ml, P = substrate volume, 100 ml and 400 ml) , to investigate the effect of substrate volume from banana peel waste left in an anaerobic tube with a time difference of three and seven days and the aid of microorganisms from mud lake bacteria. This method is done by comparing the variations of the composition of the sludge and the substrate respectively 100 ml and 400 ml. The maximum power, voltage and current generated are 0.8 mW at R7L4P1 reactor, 2681.4 mV at R3L4P1, and 287.1  $\mu$ A on R3L4P1. A stable electrical current is obtained after 2 days at the reactor with substrate substration for three days as well as 400 ml sludge and 100 ml substrate. This is because bacteria have lag phase and exponential. The 2nd day until the 10th is the stationary phase, where the bacteria do not experience division anymore. After the 10th day is the phase of death where bacterial cells die.

Keyword: *Microbial Fuel Cell*, banana peels, bacteria.

