

# Euro Green Chemistry 2018-Electricity Generation from Septic Waste Water Usin Septic Tank as Microbial Fuel Cell-Ihesinachi Kalagbor-Ken Saro Wiwa Polytechnic

Ihesinachi Appolonia Kalagbor

Ken Saro Wiwa Polytechnic, Nigeria

## Introduction:

The excessive usage of energy to a great extent all over the world has contributed significantly to energy crisis, especially from the environmental perspective. All over the world depends up on energy from coal and fossil fuels which causes environmental pollution due to addition of harmful gases in the air. This situation may cause global warming, acid rain, climate change, emission of harmful gases, and other environmental problems. The high demand of fuel and renewable energy sources which are eco-friendly has led researchers into developing renewable energy as another energy sources. Apart from the environmental concern and energy crisis, there is increased interest to find out sustainable and clean source for electricity generation with minute hydrocarbons. In recent times, a lot of renewable energy sources have aroused those are solar energy, hydroelectric energy and bio-electrochemical energy sources. Bio-electrochemical energy sources consist of an emerging another energy sources which make use of microbes for the generation of electricity. The basis of renewable energy explores the interaction between microbes, wastewater and electron acceptor. Mainly described type of bio-electrochemical source of energy is the Microbial Fuel Cells. MFCs are devices can directly convert chemical energy into electrical energy via electrochemical reactions involving biochemical pathways and biological enzymatic catalysts. Researchers had utilized wastewater and biodegradable organic rich materials such as an aerobically digested distillery wastewater, sewage water, artificial waste water, domestic waste water and biowaste in Microbial Fuel Cells to generate electricity. The wastewater generated in homes is channeled into septic tanks and it contains biomass which may be subjugated to generate electricity. The microorganisms oxidize the substrates in the anodic chamber produce electrons and protons as well as Sustainable Energy carbon (IV) oxide as the oxidation product. At the cathode, water is produced. In MFCs micro-organisms act as electrons transporter to anodes. The transport of the electrons is due to electron shuttle present in a soluble form in full volume solution in the extracellular matrix. This extracellular matrix form a bio-film in the anode. The aim of the research is to produce electricity by using the septic waste water from the female hostel by using the microbial fuel cell technology.

## Methods:

Construction of the MFC: The construction and usage of MFCs requires knowledge of both scientific and engineering fields

from microbiology and electrochemistry to materials and environmental engineering. The option of electrode materials in this construction is very essential. Metal electrodes if we used should be non-corrosive and chemically resistant. Copper has been notified as toxic to many bacteria and should be avoided. Graphite or carbon materials give good results when compared to aluminum, stainless steel or iron electrodes. Construction of the concrete septic tank indicates making provision for both inlet and outlet openings for the waste water from the septic reservoir in the female hostel of the institution.

The graphite plates were placed at equal distance and connected with copper wires. This is the anode chamber. The three anode chambers were connected together with cathode by copper wires from the anode terminals to the multimeter then to the resistor and finally to the cathode end.

## Discussion:

The MFC shows its performance and efficiency was evaluated in terms of electrical parameters namely; power density, current density, internal resistance and polarization. The biodegradation efficiency measured by using the COD and BOD. Table 1 showing its results the values of the pH, COD, BOD and TSS obtained in this study. The pH values observed to be constant from week 1 to week 12 with an average of 8.2. The total suspended solids had the maximum value of 1038 mg/L on the first day. By the end of week 1, this value had deducted by 58.6 % and on week 6 by 89.7 %. The BOD and COD showing a similar trend in reducing its values obtained as the weeks progressed. The MFC was able to reduce the BOD and COD by 92.7 % and 93.9%. COD or Chemical Oxygen Demand is the measurement of all chemicals (organics & inorganics) waste water; BOD is a measure of, the amount of oxygen that require for the bacteria to degrade the organic components present in water / waste water. BOD defined as the amount of oxygen demanded by the micro-organisms in the sewage for the decomposition of bio-degradable matter under aerobic condition. This is the most useful parameter for identify the quality of water. The standard BOD test determines the amount of oxygen required by the micro-organisms for the decomposition of the bio-degradable matter present in the wastewater sample fewer than 5 days of aerobic condition at a temperature of 20 degree Celsius. It is measured in mg/l.

The max voltage reading of 3.029V obtained on the 6th week but gradually reduced due to the formation of biofilm and decline of substrate (food) in the cell. The MFC design

generates a solution for power generation from wastewater in homes.

**Conclusion:**

The application of microbial fuel cell for electricity generation using septic waste water provides an answer for power generation. This technology can be used for wastewater treatment systems in homes and its biodegradation efficiency can be calculated by measuring the COD. MFCs can be used as

bio-sensors by regulating the BOD in the waste water. By this method, the conversion of waste to wealth has been achieved. By this research we can analyze the polluted water and Fresh water by using parameters like BOD. If BOD will be more the particular will have more polluted particles. If BOD will be less the particular water will have less polluted particles. And by this research we can generate electricity by using waste water.