The Potential of Poultry Processing Waste to Generate Renewable Energy Using Microbial Fuel Cells (MFCs)

Abdul Syukor Abd Razak*,Jadhav Pramod Chandrakant, Muhamad Hamed Saharani, Suryati Sulaiman, Mohd Nasrullah Bin Zulkifli

Faculty of Civil Engineering Technology
Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Kuantan, Pahang
Email: syukor@ump.edu.my, abdsyukor@gmail.com

Abstract:
Microbial Fuel Cell (MFCs) is a concept of applying microorganisms as catalyst in fuel cell. It works by oxidizing the electron and proton and transferred to the anode chamber under anoxic conditions to produce electricity. Microbial production of electricity might become an important form of bioenergy in future because MFCs extracting electric current from a wide range of soluble or dissolved complex organic wastes and renewable biomass. The poultry processing waste is collected from the Pusat Pemprosesan Ayam Kuantan. The double chamber MFC with three different concentration of substrate is used to generate the renewable energy from the waste. Analysis of data was performed by using a 1-way analysis-of-variance (1-way ANOVA). The significant ANOVA ($P<0.05$) studies shown the different in values of the monitored 4 parameters which indicates the data obtained is accurate. In this study, result analysis reveals that poultry processing waste is able to use as substrate in MFC hence able to produced energy. The maximum voltage that able to produce is 0.389V by using 1.2g of substrate concentration. Meanwhile, the MFC operation also is able to remove BOD and COD. These high levels of removal efficiency demonstrate the MFC system's ability to treat poultry processing waste with the added benefits of generating energy.

Keywords: Microbial Fuel Cells; Poultry processing waste; Substrate; Direct energy conversion

REFERENCES

[1] Lovley, D. (2006). Microbial Fuel Cells: Novel Microbial Physiologies and Engineering Approaches. Current Opinion in Biotechnology, 17, 327-332.

[2] [2] Fauziah, S. H., & Agamuthu, P. (2007). Recycling Options for Household Organic Waste: A Case Study of Practically Value Evaluation.

[3] Saeed, M. O. (2009). Assessment of Municipal Solid Waste Generation and Rcyclable Materials Potential in Kuala Lumpur, Malaysia. Waste Management, 29, 2209-2213.

[4] Gwang, T. K. (2004). An Investigation Into The Bacterial Community Structure of an Electricity-Generating Microbial Fuel Cell. University of Wales, Cardiff, 29.

[5] World Energy and Economic Outlook. (2010, March 14). Retrieved from Energy Information Administration: www.ei.doe.gov/oiaf/ieo/world.html