EMEC21

21st European Meeting on Environmental Chemistry
November 30 – December 3, 2021, Novi Sad, Serbia

Association of Chemistry and the Environment

Serbian Chemical Society

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BOOK OF ABSTRACTS

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on Environmental Chemistry

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Influence of Microbial Community on Power Generation Using MFC System

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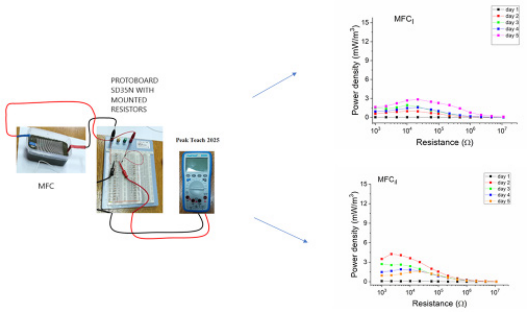

Introduction

Global worldwide population and urbanization in general have created an increasing need for new energy sources. These sources need to be renewable, but it is also very important to respect the principles of environmental protection. Microbial fuel cells (MFC) are a green technology that is attracting more and more attention in the last decade. MFC presents a system which produces electrical current through metabolic processes of microorganisms such is the decomposition of organic matter. In this process chemical energy is directly converted into electrical energy [1-3].

The performance of MFC depends on several factors: temperature, the composition of the sediment, the material from which the electrodes are made, but certainly, one of the prominent factors is the activity of a microbial community. In this paper, efficiency of two MFC systems will be compared to obtain the highest current and power generation. One of them contains only river sediment as a source of microorganisms, while the other was biostimulated by microorganisms isolated from the same river sediment [2-3].

Methods

The river sediment was placed between a set of inox electrodes in a plastic container, with a total volume of 201 cm^3 (MFC I). The second MFC (MFC II) was made in the same way, but a consortium of microorganisms, *Clostridium* sp., *Bacillus* sp. and *Tepidibacter* sp. isolated from the river sediment was added to the sediment. The set of resistors already established in our previous studies were used for the measurement of the amount of voltage, which was then used to obtained the values of current and power [4].

Results

After five days of measuring the generated voltage via MFC I and II, the results for current and power density were obtained. In MFC I, the highest current density was recorded on the fifth day and was 76 mA/m^3 while the power was 1.5 mW/m^3. With MFC II, the results were visibly higher, where the current was increased three times (up to 210 mA/m^3), and the power by as much as 4 times higher compared to the results of MFC I (6 mW/m^3).

Conclusion

Results show that MFC I has lower values than the sediment stimulated by a consortium of microorganisms in the MFC II. The community of microorganisms greatly contributes to improving the performance of the sediment itself, by generating more power density.

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