

Microbial community analysis in microbial fuel cell sediment

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Objectives

This study was aimed to determine the number of various groups of microorganisms in order to describe the microbial community present in a sample of the Danube river sediment used in Microbial Fuel Cells (MFC) processes.

Introduction

Microbial fuel cells, although first described in the XIX century, are currently in the early stages of research and are appearing as an emerging technology. MFCs are a type of biological fuel system that converts chemical energy into electricity using catalysts such as microorganisms. They are considered an eco-friendly method because they simultaneously can biodegrade organic contaminants and other waste and at the same time generate energy from it.

Methods

The number of different groups of microorganisms from the Danube river sediment used in the MFC system were investigated using different media and growth conditions. The microorganisms analyzed in the sediment sample were: total mesophilic chemoorganoheterotrophs (TC), total anaerobic chemoorganoheterotrophs (TAC), sulphate-reducing bacteria (SRB), yeast and molds (YM) and hydrocarbon degraders (HD).



Table 1. Microbiological characteristics of the sediment of the microbial fuel cell.

GROUP OF MICROORGANISMS	NUMBER OF MICROORGANISMS (CFU*/g)
TC	7.40×10^5
YM	2.45×10^3
TAC	2.40×10^4
HD	6.98×10^4
SRB	6.47×10^5

*Colony forming units

The results

The most represented group of microorganisms present in the sediment belongs to aerobic bacteria. Their role is related to the processes that operate on the cathode part of the MFC system. Anaerobic and sulfate-reducing bacteria were present in slightly smaller numbers and their metabolism contributes to the functioning of the anode compartment.