



Short Communication

Recycling Summit 2019 - Production of Antifungal Agents in a Microbial Fuel Cell (MFC) - Takashi Ano - Kindai Univ

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Abstract:

World population is now increasing, and the United Nations predicts that the world population will be 9.8 billion by 2050. The major concern is that this population increase will lead to food and energy shortages. A microbial fuel cell (MFC) is a device that produces electric power by recovering electrons generated on an electrode when microorganisms with electrochemical activity decompose an organic substances. MFCs can simultaneously perform wastewater treatment and electricity production, by using organic substance in wastewater as a nutrient source for microorganisms. To increase agricultural productivity, utilization of pesticides are necessary to solve the food shortage. In recent years, biocontrol agents are attracting attention, because of the smaller burden on the environment compared with chemical pesticides. We tried to produce electricity and antibiotics at the same time using the MFC by *Bacillus subtilis* RB14, an antifungal substance iturin A producer. As a result, it was recognized that electricity production after the 10th day of the cultivation and an antifungal activity of the culture supernatant from the MFC against *Rhizoctonia solani* K1. It seems to be the first finding that the electricity generation and the production of antifungal substance by *B. subtilis* in the MFC, and it is expected that the production of a biocontrol agent from the waste material and also the generation of electricity during the process in the same apparatus. This may open a new method for the waste material treatment and the low cost production of biocontrol agents with recovery of energy as electricity.

The principal recorded event of electrochemical movement between bacterial/contagious (yeast) species and terminals can be followed back to the mid twentieth century. It was accounted for by Potter, 1911), societies of *Escherichia coli* and *Saccharomyces* spp. delivered power utilizing platinum macroelectrodes in a battery type arrangement with sterile media.

The story of electromicrobiology increased new enthusiasm for 1963, when a NASA space program exhibited the chance of reusing and changing over human waste to power during space flights. In 1991, spearheading work by Habermann and Pommer revealed the drawn out utilization of civil wastewater by a microbial power module (MFC) without breakdown or upkeep. In addition, this investigation detailed roundabout electron move (a component of electron move permitting explicit microscopic organisms to give electrons) through dissolvable arbiters. In 1999, it was found that middle people were not fundamental segments inside MFC designs, along these lines permitting MFCs to be created without the requirement for costly mediators.

The current paper reports the aftereffects of an examination concerning the likely bioremediation of para-aminophenol (PAP) from wastewater what's more, vitality creation in a MFC involving a *S. dehoogii* carbon felt anode. The oxidation of APAP and vitality creation were examined. The achievability of the biodegradability of PAP by *S. dehoogii* was too investigated. At long last, the biodegradability of a few ligno-cellulosic materials (bagasse, rapeseed, cellulose, lignin) by *S. dehoogii* was concentrated in Petri dishes and the regular lignin from sugarcane bagasse was tried for the first run through as fuel in a FMFC.

Conclusion:

It has been demonstrated for the first time that a biofilm of *Scenedosporium dehoogii* developed by polarization at 0.15 V vs. SCE during one week established a connection to a CF bioanode. The cathode of our fungal MFC presented an optimum potential of 0.8 V vs. SCE for 3.5 0.2 μm thickness of poly-NiTSPc film. We have also shown that APAP is an efficient fuel for this FMFC. Stable output performances were obtained giving a power density of 50 mW m² for an EMF of 5

Biography:

Takashi Ano is a professor of Kindai University. He lives in Osaka, Japan. His bachelor, master and doctor degrees were awarded from Osaka University. His major fields are biocontrol agents, and microbial fuel cell aimed for the sustainable society, and has published many papers in the field (<https://researchmap.jp/read0008399/?lang=english>). He had worked in Tokyo Institute of Technology for 20 years as a research associate, and an associate professor.