

9th World Convention on

WASTE RECYCLING AND REUSE

March 11-12, 2019 Singapore



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Microbial fuel cells for the sustainable society

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. In recent years, biocontrol agents are attracting attention, because of the smaller burden on the environment compared with chemical pesticides. We could produce electricity and antibiotics at the same time using the MFC by *Bacillus subtilis* RB14, an antifungal substance iturin A producer, and 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. Soil MFC (SMFCs) could generate electricity from the organic matters in the soil. We focused on the soil ecosystems, specifically the earthworms. When earthworm were added into the SMFC, the power density increased and the internal resistance decreased. The soil structure of the SMFC w/o earthworms was different and the clear soil aggregate structure was found in the SMFC with earthworms, which showed positive effect on the growth of plants. If the power generated from MFCs can be saved, the tiny power can accumulate to make a huge energy. In this context, we performed electrolysis through the MFC, and could generate hydrogen gas. Although, this is a preliminary experiment, it could contribute to the development of the hydrogen energy-based society, which is very stable and sustainable.

Biography

Takashi Ano is currently working as a Professor at Kindai University. 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. He has published many papers in the field. He had worked in Tokyo Institute of Technology for 20 years as a Research Associate and as an Associate Professor.

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