OPEN ACCESS Freely available online

ISSN: 1948-5948
Journal of Microbial & Biochemical Technology

Perspective

Application of Microbial Fuel Cell Technology

Yang Zhou*

Department of Chemical and Biomolecular Engineering, Ohio University, Athens, USA

DESCRIPTION

Fuel cells are a new addition to the inventory of alternative energy sources with minimal or no net carbon emissions. Power generation using microbial cultures was first reported at the beginning of the last century. Microbial fuel cells (MFCs) have been described as "bioreactors that convert the energy of chemical bonding of organic compounds into electrical energy through the catalytic action of microorganisms under anaerobic conditions." MFC technology represents a new approach to generating bioelectricity by using bacteria to oxidize organic waste and renewable biomass.

One potential electricity-producing microorganism is Sporomusa ovata, an anaerobic Gram-negative bacterium that converts hydrogen and carbon dioxide to acetate by fermentation. Compared to traditional processes, MFC significantly reduces the energy requirements of sewage treatment plants. MFCs do this by engaging electroactive bacteria that can oxidize organic substances and transferring the emitted electrons to solid-state electron acceptors. H. Electrode anode.

Understanding the dynamics of biofilms (microorganisms, extracellular electron transfer and interfacial properties in pure or mixed cultures) and the development of materials such as catalysts, electrodes and membranes will reduce production costs and improve technology efficiency.

Application of microbial fuel cell technology

MFCs have been investigated as an alternative energy source, but their applications are currently limited to specific niches. Based on these short-term applications, further improvements in design, cost efficiency, and power efficiency will enable MFCs to be scaled up and used as renewable energy sources. Wastewater treatment

Microbes can perform his two tasks of breaking down wastewater and generating electricity. MFCs are currently being seriously considered as power generators in industrial, agricultural and municipal wastewater treatment processes. When microorganisms oxidize organic compounds present in the wastewater, electrons are released, creating a stable current source. If power generation in these systems can be scaled up, MFCs could represent a new way to offset the operating costs of wastewater treatment plants, making advanced wastewater treatment more affordable in both developing and developed countries. In addition, MFC is known to generate less excess sludge than aerobic treatment.

Power supply for underwater monitoring equipment

Data about the natural environment are useful for understanding and modeling ecosystem responses, but power is required to operate sensors distributed in the natural environment. MFC could potentially be used to power such devices. This is especially true in river and deep sea environments where it is difficult to access the system regularly to change batteries. Sediment fuel cells are being developed to monitor environmental systems such as rivers, rivers and oceans. The power density of sediment fuel cells is low due to both low concentrations of organics and high resistivity. However, the low power density can be compensated by energy storage devices that send data in batches to a central sensor.

With the development of microelectronics and related fields, the power requirements of electronic devices have been greatly reduced. Batteries are typically used to power chemical sensors and telemetry systems, but for some applications it is costly, time consuming, and impractical to replace batteries on a regular basis. A possible solution to this problem is to use a self-regenerating power supply such as MFC. This power supply can operate for a long time with local resources. Extensive research to develop reliable MFCs for this purpose has focused primarily on the selection of suitable organic and inorganic materials that can be used as energy sources.

BOD detection

Another potential application of MFC technology is its use as a sensor for pollutant analysis and *in-situ* process monitoring and control. Biological oxygen demand (BOD) is the amount of dissolved oxygen required to meet the metabolic needs of aerobic

Correspondence to: Yang Zhou, Department of Chemical and Biomolecular Engineering, Ohio University, Athens, USA, E-mail: Yangzhou@gmail.com

Received: 04-Nov-2022, Manuscript No. JMBT-22-19480; **Editor assigned:** 07-Nov-2022, Pre QC No. JMBT-22-19480 (PQ); **Reviewed:** 21-Nov-2022, QC No. JMBT-22-19480; **Revised:** 29-Nov-2022, Manuscript No. JMBT-22-19480 (R); **Published:** 07-Dec-2022, DOI: 10.35248/1948-5948.22.14.535.

Citation: Zhou Y (2022) Application of Microbial Fuel Cell Technology. J Microb Biochem Technol.14:535

organisms in organic-rich water such as water and Wastewater. The proportional relationship between the coulombic yield of MFC and the concentration of assailable organic pollutants in wastewater makes MFC useful as his BOD sensor. His BOD sensor of MFC type can keep working for more than 5 years without additional maintenance and has a much longer service life than other types of His BOD sensors reported in the literature.

Hydrogen production

Hydrogen production from improved MFCs fueled by organic waste could be an interesting alternative. In such devices, anaerobic conditions are maintained in the cathode chamber and an additional voltage of approximately 0.25 V is applied to the cathode. Under these conditions, protons are reduced to hydrogen at the cathode. Such modified MFCs are called bio-electro chemically assisted microbial reactors (BEAMRs).

Although this technology holds great promise as a renewable energy source, it will be some time before highly efficient MFCs reach the market at scale. Excited and motivated by the urgent need for alternative energy, various research groups operating around the world will surely overcome the shortages we face today.