

**NAME OF THE THEME: Renewable Energy Sources**

## **Dye Degradation and Bioelectricity Generation Using Microbial Fuel Cell for Sustainable and Clean Environment**

E. Sai Suvani<sup>#</sup>, Ch. Susmitha, Sreelipi, M. Jerold<sup>\*</sup>

Department of Biotechnology, National Institute of Technology Warangal, Telangana State –  
506 004, India

\*Corresponding author email: [jerold@nitw.ac.in](mailto:jerold@nitw.ac.in)

### **Abstract:**

Microbial fuel cell (MFC) is nowadays gaining importance in the bioremediation sector in removal of pollutants. In MFC microorganism degrade the organic compounds with aid of enzyme and other metabolites and convert the chemical energy into bioelectricity. During the oxidation of organic matter there is an electrons are released which moves directly into the electrode. The transfer of electrons results in the electricity generation. Microbes use different substrates like acetate, lactate, or glucose as carbon source for their cellular metabolism. In microbial fuel cells complex substrates are used as fuel for microbial growth and survival. Dye is one of the complex substrate contains organic compounds is used as substrate for the microbes. The enzyme produced by microbial cells degrades the organic dyes present in the wastewater. So, there is a decolorization of dyes and electricity is generated. Azo dyes are major synthetic highly used by the textile industry. About 10-15 % of the dyes is released in to environment and makes the water contaminated. The dyes are visible in water even at concentrations as low as 1 ppm. There are various health effects like cytotoxic and genotoxic due to the synthetic dyes and their degraded products. There are various methods available to treat the dye containing wastewater like precipitation, adsorption, and reverse osmosis, chemical methods such as oxidation. However, each method has its own drawbacks. MFC is alternative method of wastewater treatment with electricity generation. The azo dye can be degraded either in anodic or cathodic chamber. This review is focused on summarizing the usage of MFC for treatment of dye and simultaneous electricity generation.

**Keywords:** *Wastewater, Dye, Electricity, Enzymes, Microorganism, Microbial Fuel cell,*

**Paper ID** *(To be added by Programme Committee)*