

About the Book:

This book represents a novel attempt to describe microbial fuel cells (MFCs) as a renewable energy source derived from organic wastes. Bioelectricity is usually produced through MFCs in oxygen-deficient environments, where a series of microorganisms convert the complex waste into electrons via liquefaction through a cascade of enzymes in a bioelectrochemical process.

The book provides a detailed description of MFCs technologies and their applications, along with the theories underlying the electron transfer mechanisms, the biochemistry and the microbiology involved, and the material characteristics of the anode, cathode and separator. It is intended for a broad audience, mainly undergraduates, energy researchers, scientists working in industry and at research organization, energy specialists, policymakers and anyone else interested in the latest developments concerning MFCs.

Contents:

- 1. Introduction*
- 2. Principles of microbial fuel cell for the generation*
- 3. Characteristics of microbes involved in microbial fuel cell*
- 4. Microbial ecology of anodic biofilms: From species selection to microbial interactions*
- 5. Anodic electron transfer mechanism in bioelectrochemical systems*
- 6. Development of sustainable anode materials for microbial fuel cells*
- 7. Performance of separator and membraneless microbial fuel cell*
- 8. Role of cathode catalyst in microbial fuel cell*
- 9. Role of biocathodes in bioelectrochemical systems*
- 10. Physicochemical parameter governing microbial fuel cell performance*
- 11. Reactor design for bioelectrochemical systems*
- 12. Microfluidic microbial fuel cell: On-chip automated and robust method to generate energy*
- 13. Diagnostic tools for the assessment of MFC*
- 14. Modelling of reaction and transport in microbial fuel cells*
- 15. Bioremediation and power generation from organic wastes using microbial fuel cell*
- 16. Removal and recovery of metals by using bio-electrochemical*
- 17. Sediment microbial fuel cell and constructed wetland assessment with it*
- 18. Fundamentals of microbial desalination cell*
- 19. Biophotovoltaics : Conversion of light energy to bioelectricity through photosynthetic microbial fuel cell technology*
- 20. Application of microbial fuel cell as a biosensor*