PROMISING AREAS OF BIOFUEL CELL USE

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A biofuel cell (BFC) is a bioelectrochemical device that can directly produce electricity or biohydrogen as a result of highly efficient “cold” fuel combustion. Nowadays there is no unified
definitive classification and terminology, because BFCs are complex devices and they are still at research stage.

Ukrainian scientists have proposed a classification of BFCs based on nature of the biological component in the anode chamber, type of enzymes, presence of mediators, etc. Such classification is still relevant today, but due to the expansion of research areas and promising fields of BFC implementation and creation of hybrid and integrated systems there is a need to expand the review of existing BFC. The aim of the work was to study the current state of development of different BFC types and prospects for their implementation.

Results of the analysis of modern publications in the field of BFC research have revealed a wide range of variations and possible promising fields of BFC application.

Further research and implementation of these devices as environmentally friendly fuel for autonomous operation of robots, in biosensors and for wastewater treatment etc. should be based on the study of biotechnological parameters of biofilm formation and operation of BFC.

**Key words:** biofuel cell, biofilm, biosensor, microbial fuel cell, biocathodes.

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12. Chiranjeevi P., Chandra R., Mohan S. V. Ecologically engineered submerged and

*E. coli*


, Fertig S.  
, J.  
, Lovley D.  
, R.  
Harnessing microbially generated power on the seafloor.  
[https://doi.org/10.1038/nbt716](https://doi.org/10.1038/nbt716)

Role of macrophyte and effect of supplementary aeration in up-flow constructed wetland-microbial fuel cell for simultaneous wastewater treatment and energy recovery.  
*BIOPHYS*.  
[https://doi.org/10.1016/j.biortech.2016.10.079](https://doi.org/10.1016/j.biortech.2016.10.079)

, L.
   [https://doi.org/10.1002/biuz.201310502](https://doi.org/10.1002/biuz.201310502)

   [https://doi.org/10.1002/bit.21687](https://doi.org/10.1002/bit.21687)


   [https://doi.org/10.1016/j.rser.2018.09.044](https://doi.org/10.1016/j.rser.2018.09.044)


wastewater treatment: How might microbial fuel cells contribute.  
https://doi.org/10.1016/j.biotechadv.2010.07.008


https://doi.org/10.1016/j.bios.2016.01.016

https://doi.org/10.1016/j.watres.2007.10.007

https://doi.org/10.1016/j.renene.2018.01.061

https://doi.org/10.1016/j.renene.2018.01.061


A.

High rate copper and energy recovery in microbial fuel cells. 
*Front Microbiol [Internet].*  
2015, V. 6. Available from:  
https://doi.org/10.3389/fmicb.2015.00527