Environmental Engineering and Management Journal

February 2017, Vol.16, No. 2, 421-429
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

INFLUENCE OF ELECTRODE MATERIAL ON PERFORMANCE OF SEDIMENT MICROBIAL FUEL CELL REMEDIATING AQUACULTURE WATER

Thypparampil Karunakaran Sajana[1], Makarand Madhao Ghangrekar[2*], Arunabha Mitra[1]

[1]Department of Agricultural and Food Engineering, Indian Institute of Technology, Kharagpur 721 302, India
[2]Department of Civil Engineering, Indian Institute of Technology, Kharagpur 721 302, India

Abstract

Non-availability of good quality water in sufficient quantities and the environmental impacts of used water discharges have led to the treatment and reuse of the aquaculture water contaminated with dissolved organics and ammonia rather than discharging it. This paper explores the effectiveness of *in-situ* sediment microbial fuel cell (MFC) for aquaculture water treatment along with generation of electricity. A sediment microbial fuel cell (SMFC) was designed and the efficiency of stainless steel mesh as well as graphite plate electrodes have been looked into. The graphite plate SMFC gave higher COD, TKN and TN removal efficiency (79 ± 1%; 94 ± 3%; 62 ± 4%, respectively) than stainless steel SMFC (69 ± 3%; 74 ± 4%; 30 ± 3%, respectively). This SMFC demonstrated successful treatment of aquaculture water offering the advantage of *in situ* remediation of aquaculture pond water. This system will have the potential to drastically reduce the cost of treatment apart from savings in the pumping cost, which is inevitable when the aquaculture water is treated externally and reused. As expected, these SMFCs generated very low power that can be used for powering the sensors and demonstrated successful *in-situ* remediation of aquaculture water.

Key words: aquaculture water treatment, COD removal, nitrogen removal, sediment microbial fuel cell

Received: September, 2012; Revised final: October, 2013; Accepted: October, 2013

[*] Author to whom all correspondence should be addressed: e-mail: ghangrekar@civil.iitkgp.ernet.in; Phone: +91-3222-283440