



“Gheorghe Asachi” Technical University of Iasi, Romania



EFFICIENCY OF A FISHPOND AT EAST CALCUTTA WETLANDS IN IMPROVEMENT OF WATER QUALITY

**Abhishek Roy Goswami^{1,2*}, Utpal Singha Roy³, Anulipi Aich^{1,4},
Buddhadeb Chattopadhyay¹, Siddhartha Datta², Subhra Kumar Mukhopadhyay⁵**

¹Government College of Engg. and Leather Technology, LB III, Salt Lake City, Kolkata-700 098

²Department of Chemical Engineering, Jadavpur University, Kolkata-700 032, India

³Department of Zoology, Durgapur Government College, J. N Avenue, Durgapur 14, India

⁴Department of Life Sciences and Biotechnology, Jadavpur University, Kolkata-700 032, India

⁵Department of Zoology, Hooghly Mohsin College, Chinsurah-712 101, India

Abstract

The Storm Water Flow (SWF) and the Dry Weather Flow (DWF) canals carry composite industrial and municipal effluent (nearly 50,000 m³ d⁻¹) from Kolkata city. Wastewater from SWF and DWF canals is used for pisciculture at the East Calcutta Wetland (ECW) for nearly a century. A wastewater fed pisciculture pond was selected to study the efficiency of the pond in treatment of wastewater. Monthly changes of hydraulic variables *viz.* inflow and outflow rates, depth, hydraulic loading rates, detention time of water at the pond were estimated. The monthly and seasonal changes of removal efficiency (*RE*) of TDS, TSS, alkalinity, hardness, phosphate, nitrate, BOD, COD, Cr, Mn, Fe, Cu, Zn and Pb and dependence of the *RE* values upon hydraulic variables, physicochemical and biological factors were also explored. The hydraulic variables (water depth, inflow volumes, hydraulic loading rate and detention time) revealed a definite seasonal fluctuation pattern influenced primarily by rainfall. Efficient reduction of BOD, COD and the elements from the fishpond was recorded. Most of the factors showed higher mean seasonal removal efficiencies during monsoon and post-monsoon. The ameliorative efficiency of the wastewater-fed fish pond proved to be quite good when compared to natural and constructed wetlands. The average detention time of wastewater at the pond was calculated to be about 34 days and the period would be essential for the pond to ameliorate the pollutant load of the raw composite wastewater at the ECW.

Key words: amelioration, detention time, East Calcutta Wetlands, removal efficiency, wastewater

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

* Author to whom all correspondence should be addressed: email: rg.abhishek@gmail.com; Phone +91 9831931952, (033)2335-6977; Fax (033)23356977