AN APPROACH ON ATTACHED GROWTH PROCESS FOR DOMESTIC WASTEWATER TREATMENT

Alireza Valipour\textsuperscript{1*}, Seyed Masoud Taghvaei\textsuperscript{1}, Venkatraman Kalyan Raman\textsuperscript{2}, Gagik Badalians Ghoolikandi\textsuperscript{3}, Shervin Jamshidi\textsuperscript{3}, Nazanin Hamnabard\textsuperscript{1}

\textsuperscript{1}Water and Wastewater Research Center (WWRC), Water Research Institute (WRI), Shahid Abbaspour Blvd., Tehran, 16765 313, Iran
\textsuperscript{2}RDA-RTIC, Thermax Limited, Pune – 19, India
\textsuperscript{3}Department of Water and Wastewater Engineering, Power and Water University of Technology (PWUT), Shahid Abbaspour Blvd., Tehran, 16765 1719, Iran

Abstract

The applications of biofilm treatment technologies for domestic wastewater are being increased in many parts of the world. The aim of the study is to assess a compacted aerobic attached growth fix-film unit (termed Bio-cache) for treatment of small volume domestic wastewater. The system consists of the miniature plastic packing matrix, which provides a large surface area of 300 m\textsuperscript{2}/m\textsuperscript{3}, so as to maintain the high rate growth of viable organisms responsible for organic degradation. The study on the Bio-cache was undertaken in a laboratory scale and analytical data were collected before and after treatment. This paper also investigates microbial flora present in the system by isolating and identifying the microorganisms. At the optimum hydraulic retention time (HRT) of 2 h, approximately 78\% Chemical Oxygen Demand (COD), 88\% Biological Oxygen Demand (BOD\textsubscript{5}), 32\% Total Dissolved Solids (TDS), 72\% Total Suspended Solids (TSS), 9\% Chlorides, 75\% ammonia nitrogen (NH\textsubscript{3}-N), 40\% phosphate (PO\textsubscript{4}-P), 93\% most probable number (MPN) and 95\% total viable count (TVC) reduction was achieved in the Bio-cache system. A comparative evaluation was done with the inferior surface fixed packing conduits and better treatment efficiency with lower wastage sludge biomass concentration was observed by the Bio-cache packed bed media. This study indicates a possibility of substantially effective attached growth system for small volume domestic wastewater treatment.

Key words: attached growth system, pack bed, hydraulic retention time, domestic wastewater treatment, sewage

Received: May, 2011; Revised final: April, 2012; Accepted: May, 2012

* Author to whom all correspondence should be addressed: e-mail: alirezavalipour.envi@gmail.com; Phone: 0098-9380573383