

2nd International Conference and Expo on

Water Microbiology & Novel Technologies

August 28-30, 2017 Philadelphia, USA

Evaluation of household level constructed wetland model for domestic wastewater treatment

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In Pakistan, water shortage and water pollution is an evolving situation and there is no proper and effective wastewater collection and treatment and management system for the industrial and domestic wastewater. Constructed wetlands are eco-friendly engineered systems employed for the effective sewage water and domestic wastewater treatment. In current study, hybrid constructed wetlands were designed, built and operated in order to develop a system to improve the quality of discharged effluents, from a single household unit. The system comprised of horizontal subsurface flow constructed wetland (HSSF CW) followed by vertical subsurface flow constructed wetland (VSSF CW) and free water surface (FWS) wetland. All subsurface flow units were planted with *Typha latifolia* and free water surface with *Centella asiatica*. This hybrid unit was operated at continuous average flow rate of 1.6 liter per day with measured HRT of 8.6 days. Year round performance of the system was monitored for summer and winter seasons. Samples were taken every week from the inlet and outlet of the system and processed for COD, BOD, Nitrite, Nitrate, Sulphate, Phosphate, TSS and MPN count. Significant results were found during the study and effluent of the system meets the national standards of water discharge by giving average removal efficiencies of 89.61% for COD, 89.0% for BOD, 94.0% for NO₂, 81.13% for NO₃, 36.94% for SO₄²⁻, 66.29% for PO₄³⁻, 94.5% for TSS and 96.36% for MPN. Effect of season was also continuously checked throughout the study. It has been observed that low temperature have negative effect on the removal of all contaminants except TSS. Significant removal of contaminants in integrated hybrid system suggests that hybrid constructed wetlands are good option for the treatment of domestic wastewater being cost effective and environmental friendly. This system can be upgraded to field scale under local environmental conditions of Pakistan.

Biography

Mahwish Ali has completed her PhD in Environmental Microbiology with topic covered wastewater treatment through constructed wetland. She has her expertise in the topic from George Washington University USA. Further, she is continuing her studies in Ghent University Belgium for advanced and computational research on constructed wetlands. She also served with Critical Green Pvt. limited to give green solutions to industries to treat their wastewater. Currently, she is working with sugar industries to help them treat their wastewater

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