

WASTEWATER TREATMENT WITH VERTICAL SUBSURFACE FLOW CONSTRUCTED WETLAND

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ABSTRACT

Water is a vital natural resource and covers about one-third of surface of the earth. This is essential for multiple purposes. Its uses include drinking and other domestic uses, industrial cooling, power generation, agriculture (irrigation), transportation and waste disposal. After such anthropogenic activities, haphazard disposal of wastewater is deteriorating water bodies and the surrounding environment in the progressing world. In the modern times, there are several systems to treat municipal wastewater and one of them is Constructed wetland system. Constructed wetland system imparts natural and economical treatment to the wastewater and has been proven sustainable and effective alternative to the conventional treatment systems. In this study, performance of fabricated model of Vertical Subsurface Flow Constructed Wetland (VSFCW) on which effluent characteristics of Kitchen wastewater and Domestic wastewater like BOD, COD, TSS, Nitrates, Ammoniacal Nitrogen and TKN were studied at two different detention periods i.e. 24 hours and 3 days. The vegetation cover provided to the wetland system was *Phragmites australis*. Experiment was carried out from month of March to June in the temperature ranging between 30°C-46°C. 30% and 61.4% loss of influent through evapotranspiration was observed at 24 hours and 3 days HRT respectively and hence it is an efficient system to minimize highly polluted wastewaters. Kitchen wastewater, when treated at 24 hours HRT shows average percentage removal of 91.71% in BOD, 82.13% in COD, 93.63% in TSS, 57.48% in Nitrates, 57.30% in Ammoniacal nitrogen and 67.73% in TKN and when treated at 3 days HRT shows average percentage removal of 94.14% in BOD, 87.09% in COD, 97.26% in TSS, 86.81% in Nitrates, 83.60% in Ammoniacal nitrogen and 82.54% in TKN. Domestic wastewater, when treated at 24 hours HRT shows average percentage removal of 86.90% in BOD, 54.75% in COD, 84.66% in TSS, 65.35% in Nitrates, 65.81% in Ammoniacal nitrogen and 70.22% in TKN and when treated at 3 days HRT shows average percentage removal of 89.66% in BOD, 72.97% in COD, 93.82% in TSS, 88.95% in Nitrates, 82.59% in Ammoniacal nitrogen and 79.94% in TKN. Kitchen wastewater showed better results than Domestic wastewater. It was found that higher the organic strength of the wastewater better is the removal efficiency of the VSFCW.