

## Potential Use of Selected Macrophytes Based Constructed Wetlands for the Treatment of Landfill Leachate

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Phytoremediation using constructed wetlands (CWs) is widely practiced for the removal of contaminants in landfill leachate. The present study was planned to assess the potential of floating macrophytes (*Eichhornia crassipes* and *Pistia stratiotes*) and emergent macrophytes (*Typha angustifolia* and *Chrysopogon zizanioides*) in improving the quality of leachate discharged from a Sequencing Batch Reactor (SBR) system located at Dompe sanitary landfill, Gampaha, Sri Lanka. The batch type CWs were arranged to identify the suitable dilution of leachate (as 0%, 25%, 50% and 75%) for the optimum plant growths. Based on the preliminary investigations, the potential of improving leachate quality by (ia) *E. crassipes* (T<sup>50</sup><sub>1</sub>) (ib) *T. angustifolia* (T<sup>50</sup><sub>2</sub>) and *C. zizanioides* (T<sup>50</sup><sub>3</sub>) at 50% dilutions and (ii) *T. angustifolia* (T<sup>0</sup><sub>4</sub>) and *C. zizanioides* (T<sup>0</sup><sub>5</sub>) at 0% dilution were assessed in continuous flow CWs. Water quality parameters including temperature, pH, electrical conductivity, turbidity, BOD, COD, TSS, phosphate, ammonium nitrogen, nitrate, sulphate and color were tested once in five days for 40 days period. Results were subjected to One-way ANOVA followed by Tukey's pair wise tests in Minitab 14. Two sample t-test at 95% CI was also applied as required. With respect to controls, percentage reductions of measured parameters increased in wetlands having either floating macrophyte, *E. crassipes* or selected emergent macrophytes. Nevertheless, among the emergent plants, *C. zizanioides* [(T<sup>50</sup><sub>3</sub>) and (T<sup>0</sup><sub>5</sub>)] showed the highest performance in improving leachate quality followed by *T. angustifolia* [(T<sup>50</sup><sub>2</sub>) and (T<sup>0</sup><sub>4</sub>)] at both dilutions. Although *E. crassipes* (T<sup>50</sup><sub>1</sub>) showed higher percentage reductions of the selected parameters at 50% dilutions, this is not recommended as leachate dilutions are impractical in CWs. *P. stratiotes* has proven unsuccessful in the present study. Therefore, among the plant species selected, *C. zizanioides* that performed at 0% dilution could be recommended as the best plant for the remediation of leachate draining from SBR system.

**Keywords:** Phytoremediation; MSW leachate; Emergent macrophytes; *Chrysopogon zizanioides*; *Typha angustifolia*

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