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## Improvement of the Existing Integrated Leachate Treatment System in Gohagoda Dumpsite in Kandy in Sri Lanka

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Kandy is the hill capital of Sri Lanka having nearly 1,375,382 populations. Generated solid waste within the Kandy city is disposed in the Gohagoda dumpsite since 1960. Leachate generating from dumpsite is polluted surrounding water bodies since long time. Therefore, an integrated leachate treatment system (LTS) had been established by Ecotech Lanka Limited with the collaboration of University of Peradeniya and Kandy Municipal Council (KMC) to rehabilitate the dumpsite. This research was conducted to evaluate the performance of available system and investigate methods to improve the quality of LTS through laboratory scale experiments.

Samples were obtained from 13 pre-defined points on weekly basis for three months and analyzed for pH, Salinity, Total Dissolved Solid (TDS), Electrical Conductivity (EC), Dissolved Oxygen (DO), Total Solid (TS), Total Volatile Solid (TVS), Total Suspended Solid (TSS), Total Volatile Solid (TVS), Biochemical Oxygen Demand (BOD), Heavy metals to determine water quality of surrounding area. It was clearly monitored that the LTS not functioned properly and laboratory scale experiments were conducted to treat the effluents to meet the Central Environmental Authority (CEA) standards by using sand and charcoal filters with addition of clay and alum. Average pH, EC, Salinity, DO, BOD, TS, TDS, TSS, VS, VSS were 7.24, 22.74mS, 12.71‰, 0.31mg/L, 15977.57 mg/L, 29537.04 mg/L, 12437.5 mg/L, 10796.25mg/L, 10942.08mg/L and 3250 mg/L respectively. Pb, Mn, Ni and Zn concentrations were 0.31, 7.4, 0.202 and 0.07mg/L respectively.

Using the sand filter, EC and salinity removal efficiency were increased upto 24.92% and 27.58%, while the charcoal filter EC, salinity, TDS were 39.52%, 39.62% and 39.54% respectively. More than 8.53% of EC, 10.41% of salinity, 9.89% of TDS and 26.81% of DO were removed by adding 3g of clay. Alum showed maximum TDS removing efficiency with 0.2g/100ml dosage. pH in the system could be reduced upto 6.63. TDS, DO and BOD were reduced upto 9,120 mg/L, 0.38mg/L and 21,900mg/L respectively. Reactor composite liner permeability is reduced with the time after operation. Therefore LTS should be rehabilitated according to the improvement and further studies should be needed to confirm the findings.

**Key words:** *Leachate, Leachate treatment bioreactor, sand filter*

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