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Performance of pilot scale anaerobic biofilm digester (ABD) for the treatment of leachate from a municipal waste transfer station

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ABSTRACT

The anaerobic treatment of leachate from a municipal waste transfer station in Malaysia was tested using a pilot scale anaerobic biofilm digester system that was operated under HRT sequence of 30-day, 25-day, 20-day and 10-day for 163 days under mesophilic conditions. Despite the leachate's complex characteristics, the system showed great performance given its maximum COD, BOD₅ and total phosphorus removal efficiencies of 98±1%, 99±1% and 92±9% respectively. The system was stable throughout its operation and showed optimal average values for the monitored parameters such as pH (7.53±0.14), total VFA (79±66 mg HOAc/L), alkalinity (10,919±1556 mg CaCO₃/L) and a non-toxic value for accumulated ammonia (960±106 mg NH₃-N/L). Measurement of the average daily biogas production yielded a value of 25±1 m³/day throughout the system's operation with a composition of 57±12% methane and 26±6% carbon dioxide.

Keywords: Anaerobic biofilm digester; Leachate; Organic pollutants; Biogas

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