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GAS PARAMETERS IN DEVELOPING LANDFILL BIOREACTOR LYSIMETER

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Municipal Solid Waste (MSW) has attained an alarming dimension for their management in developing countries during the last few decades due to rapid urbanization and economic development. In Sri Lanka, management of MSW has become a serious problem due to increase in waste generation and lack of suitable disposal facilities. Open dumping is the most common solid waste disposal method in the region. Landfills are needed in any integrated solid waste management system and it is the core of the technologies available for managing wastes. As a consequence, this study on landfill bioreactor is an attempt to upgrade prevailing dumpsites by improving the reduction in gaseous emissions.

The constructed landfill bioreactor lysimeter mainly consists of main reactor, leachate collection, storage, and recirculation and gas collection systems. The parameters of gas production and composition were anal sized in the lysimeter for 116 days. This lysimeter produced maximum of 119 liters of gas/day (6.639516 m^3/kg of dry matter/year), which comprises cent percent H_2 up to 42 days and gradually reduced towards methanogenesis. The analyzed parameters showed that the same trends like in previous literature even though the accelerated degradation in this lysimeter shortened the each phases due to leachate re-circulation. It was shown that the bioreactor operations enhanced the degradation process by shortening the acid phase and early initiation of methanogenesis phase.

Key words: landfill bioreactor, lysimeter, gas parameters, leachate recirculation, emissions.

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