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LIQUID INJECTION TO ENHANCE BIOGAS PRODUCTION IN LANDFILLS FOR PRETREATED MUNICIPAL SOLID WASTES - BIO.LEA.R. PROJECT (LIFE+ PROGRAM)

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Abstract

The Bio.Lea.R project aims to demonstrate the performance of a landfill for less reactive, biologically treated waste (pretreated organic wastes) compared to a conventionally managed landfill, with regard to both environmental (biogas and leachate production) and economic aspects. The objective is to control the pretreated biodegradable waste through a liquid injection in order to achieve the same biogas quantity in a shorter time than in conventional landfill.

Laboratory and full scale monitoring were performed in order to check the efficiency of the landfill acting as bioreactor. A small-scale lysimeter was set up to simulate in laboratory the biological processes that happen at a bioreactor landfill. The lysimeter consists of a cylindrical reactor filled with waste. The monitoring activity of the geophysical parameters of the landfill is based on network of geophysical sensors to detect the changes in time and space of the electrical conductivity at different depth in the landfill. Electrical conductivity is potentially a good indicator of spatial and temporal changes of liquid content of the waste within, as results of the infiltration process.

Results of the lysimeter experiment have proved the faster production of biogas, with the Methane Potential Yield at 900 days. The current modeling of leachate infiltration is influenced by availability of experimental data which in this case are provided by time lapse monitoring of geophysical parameters. The combination of time-lapse geophysical monitoring, advanced inversion technique and traditional waste sampling techniques provides robust data to evaluate the infiltration process and degradation of waste.

Key words: bioreactor, biogas, geophysical monitoring, sanitary landfill

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