Title: Suitability of Microwave and Microwave-coupled Systems for Landfill Leachate Treatment: An Overview

Authors: Binay Kumar Tripathy, Mathava Kumar

PII: S2213-3437(17)30597-3
DOI: https://doi.org/10.1016/j.jece.2017.11.039
Reference: JECE 2006

To appear in:

Received date: 10-9-2017
Revised date: 6-11-2017
Accepted date: 14-11-2017

Please cite this article as: Binay Kumar Tripathy, Mathava Kumar, Suitability of Microwave and Microwave-coupled Systems for Landfill Leachate Treatment: An Overview, Journal of Environmental Chemical Engineering https://doi.org/10.1016/j.jece.2017.11.039

Suitability of Microwave and Microwave-coupled Systems for Landfill Leachate Treatment: An Overview

Binay Kumar Tripathy[1], Mathava Kumar[1*]

[1]Department of Civil Engineering, Indian Institute of Technology Madras, Chennai, Tamilnadu, India - 600036

[*]Corresponding author: Email: mathav@iitm.ac.in; Phone: +91- 44-22574267

Abstract

The rate of solid waste generation has been increased several folds due to rapid urbanization, earning potential, increase in the living standards of people and population growth. Among the several methods available for the disposal of solid waste, land-filling is mostly preferred owing to its cost effectiveness and simplicity in operation. However, generation of harmful leachate from landfills has been an environmental concern. At the same time, leachate treatment has been one of the biggest challenges owing to its requirements for complicated treatment units and high-cost. In the recent years, microwave (MW) technology has been used extensively in wastewater and leachate treatment due to its rapid and selective heating properties, better mineralization/degradation/solubilization effect on organic carbon and volatilization of ammonia nitrogen. However, the application of MW technology is trifling due to lack of understanding in the coupling of MW with other systems, its reactor design and cost/economical analysis of MW systems. This overview addresses the different conventional methods and MW applications employed for landfill leachate treatment. Moreover, the suitability of MW for leachate treatment in terms of power consumption, efficiency and cost of operation were addressed. Finally, the potential of MW-coupled systems for rapid leachate treatment and their challenges were discussed.

Keywords: Microwave; Advanced oxidation; Landfill leachate; Wastewater treatment, Organics removal; Ammonia removal.

1. Introduction

The municipal solid waste (MSW) and industrial solid waste (ISW) generations have been increasing at an alarming rate owing to the growth in urban population, increase in the level of living standards and also due to industrial revolution. The rate of waste generation around the world especially in the Indian subcontinent is increasing rapidly