

Study on Leachate Management and Design of Experimental Setup for Treatment of Leachate using Bio-absorbent

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Abstract: *The management of leachate, a complex and environmentally hazardous effluent generated from solid waste landfill sites, poses significant challenges to environmental engineers and policymakers worldwide. In this study, we present a comprehensive investigation into leachate management strategies with a focus on the design and implementation of an experimental setup for its treatment by using the method of Treatment unit Initially, we conducted a thorough review of existing literature to understand the composition, characteristics, and environmental impact of leachate. This literature review informed the development of effective treatment strategies targeting key contaminants such as heavy metals, organic pollutants, and pathogens present in leachate. Subsequently, we designed and constructed an experimental treatment setup tailored to address the specific challenges associated with leachate treatment. The experimental setup integrates various treatment processes including physical, chemical, and biological methods to achieve comprehensive removal of contaminants.*

To evaluate the efficacy of the experimental setup, we conducted a series of laboratory-scale experiments using synthetic leachate samples. The sample treated by MSV LABORATORY such Parameters are turbidity, biological oxygen demand (BOD), NPK, heavy metal concentrations throughout the treatment process.

Preliminary results indicate promising outcomes in terms of contaminant removal and it is found that promising results are seen with peanut shell as the bio-absorbent, with significant reductions observed in BOD 2050 mg/l (from 7301mg/l), and heavy metal (Lead as Pb 0.11 mg/l), (Cadmium as Cd 0.2mg/l), Turbidity (49 mg/l) is concentrations. Additionally, microbial analysis revealed a substantial reduction in pathogenic microorganisms following treatment. In conclusion, this study contributes to the advancement of leachate management practices by offering insights into effective treatment strategies and the design of experimental setups for practical implementation. The sample treated to yield the best results in peanut shell bio absorbent is now being utilized in irrigation fields and gardening applications.

Keywords: leachate