

# “Study on Treatment of Vijayapur Municipal Solid Waste Land fill Leachate using Up-flow reactors with low cost waste Adsorbent Materials.”

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## **Abstract:**

The main objective of the present paper was to exploit the treatment of municipal solid waste landfill leachate. This paper present the experimental results obtained on the treatment of landfill by using waste adsorbent media. The present study mainly focused on the treatment of municipal solid waste landfill leachate by using up-flow reactors with using waste laterite stones and waste brick bats.

**Key Word:** Laterite stone, Brick bats, Land fill, Up-flow reactors

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## **I. Introduction**

Urban cities are a link to connect for a future threat to the environment because of the production of increasing complexity and quantity of wastes. About 1.7-1.9 billion metric tons of municipal solid waste is generated worldwide. In many cases, municipalities cannot handle the produced wastes and municipal wastes are not well managed in developing countries, about 50% of collected waste is often disposed uncontrolled land filling and wastes collection is lower than 70% in low-income countries. About 15% is processed through un safe and informed cycling establishing and advanced improved facilities for collection recycling, treatment and disposal for municipal solid waste management will be very costly. For example establishment of building and operating sanitary landfill and incineration plants needs huge investments and huge maintenance and operation costs. Furthermore, it is difficult to find a suitable place or location for waste treatment facilities due to attitude among the countries therefore urban has to be encouraged to pursue the paths of reduce, reuse, and recycles instead of waste reduction, waste prevention and waste recycling due to solid waste creates nuisance, odour. It attracts mosquitoes, flies, street animals etc., which is a route to transmit various diseases.

surrounding soil, ground water aquifers, and nearby surface water if any. Hence various studies reveals that, the Leachate generation and control has become a major problem and challenging to available technologies in urban areas. Also due to increase in population, increases urbanization and industrialization, there by increases the generation of solid waste. Now a day the availability of suitable land for the disposal of solid waste is very difficult task with economical consideration, for the disposal of solid waste as well as Leachate treatment process.

Leachate concentration may exceed permissible levels. So Leachate treatment and its management over a landfill is the most important issues. If Leachate is directly disposed into environment it creates serious problems on the surrounding soil, ground water aquifers and nearby surface water. Therefore great attention has been directed towards new techniques based on physio-chemical process. In this stage, experimental setup is made in the laboratory to treat landfill Leachate with low-cost waste adsorbents using up-flow reactors which are fabricated using PVC pipes.

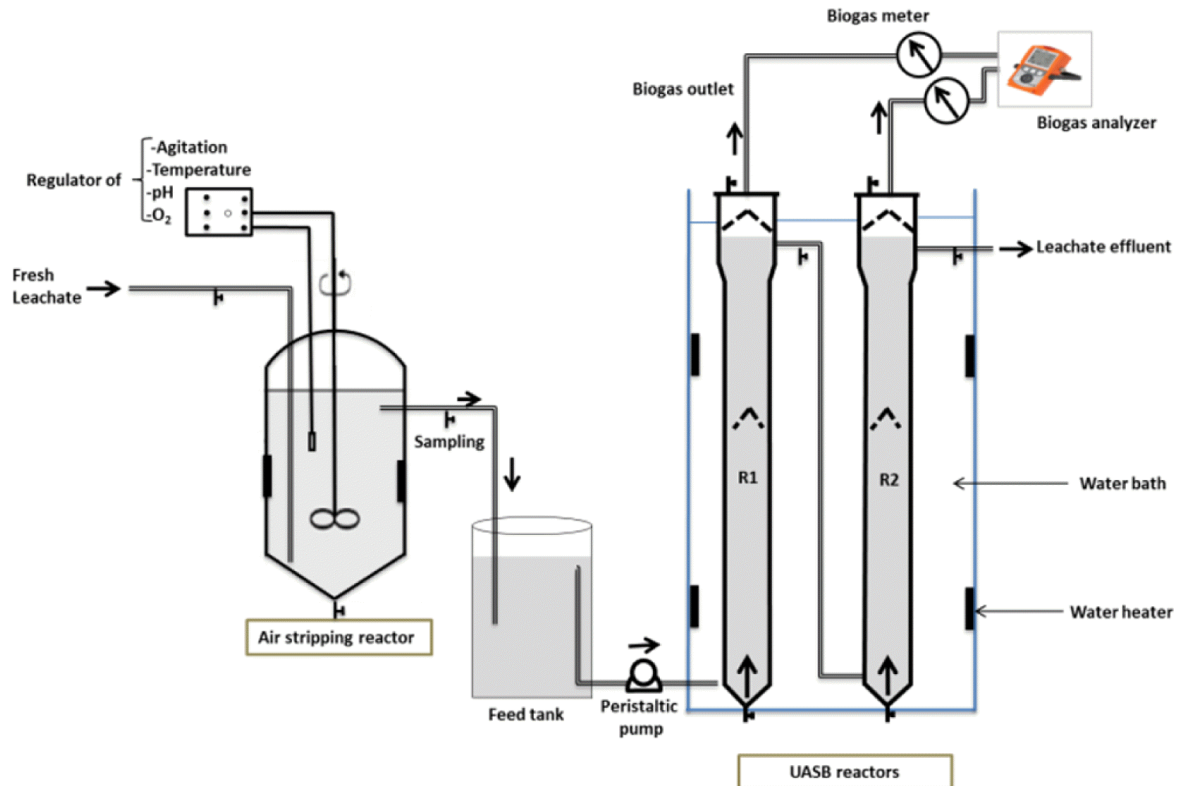
## **II. Material And Methods**

**Materials used in treatment of Leachate For experimental study following materials were obtained.**

1. Reactor body: PVC pipe reactor is purchased from supplier.
  2. Adsorbent material: Waste Laterite stones and waste brick bats.
  3. Leachate is collected from Municipal solid waste disposal site at VIJAYPUR
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**1. Reactor body: PVC pipe reactor is purchased from supplier.**

Two Up-flow reactors R1 and R2 are used for the study purpose, which were fabricated using sanitary PVC pipe of 6kg pressure, having 130 mm internal diameter and 900mm height. Each reactors are provided with 100mm free board at the top. The distance of 800mm is maintained between inlet and outlet ports which were kept constant in all two reactors and volume was found to be 11.94 litres. Separate Leachate storage tanks of 25 litres capacity are used shown in figure 3.1 The Leachate is passed to two reactors with the help of peristaltic pump. The flow rate or hydraulic retention time is 20ml/min is fixed.



**Land Fill Leachate Up flow Reactors**

**1. Laterite Stone**

- The experiment was carried out using the process of adsorption in which laterite material was used as a adsorbent media.
- Laterite is heavily weathered subsoil, rich in oxides of iron, aluminum or both ranging from reddish yellow to dark brownish red in colour.
- They are highly porous in nature and acts as a good adsorbent media.
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**Fig.2 Laterite Stone**



**Fig.3 Laterite Stones**

## 2. Brick Bats

- In this study waste brick bats are also used as a low cost adsorbent media in the treatment of municipal solid waste landfill Leachate.
- The two different types of brick bat granules of size 4.75mm-2.36mm and 12.5mm-10mm are prepared in the laboratory.
- The media prepared and are used in the treatment studies using up-flow Reactor.



**Fig.4 Brick Bats**



**Fig.5 Brick Bats**

## III. Conclusion

- Landfill leachate often possesses significant pollution potential with high concentrations of organic and inorganic contaminants.
- Primary landfill leachate technique consist of physical, chemical, and biological methods.
- Owing to high concentration of contaminants in landfill leachate and its low biodegradability , integrated treatment methods and co-treatment with waste water are strongly recommended.

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