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CHARACTERISTICS OF LANDFILL LEACHATE FROM SRINIVASAPURAM DUMPING YARD, THANJAVUR

B. ARTHEE[a1] AND A. SANGEETHA[b]

[a]Department of Civil Engineering, Periyar Maniammai University, Vallam, Thanjavur, India
[b]Assistant Profesor of Civil Engineering, Periyar Maniammai University, Vallam, Thanjavur, india

ABSTRACT

Municipal solid waste is one of the major problems in Indian cities. About 90% of the solid wastes are not properly handled. It is disposed in open dumping and landfill. In landfill the major problem is leachate generation. As it contains organic matter and toxic substances it affects ground water quality if it is not treated properly. Hence this should be treated before discharge into land surface. As study was undertaken to examine the characteristics of landfill leachate. The leachate was collected from Srinivasapuram dumping yard (of Thanjavur town). The age of the leachate at the time of collection was about 30 - 40 days. The parameters studied include pH, total dissolved solids, and total suspended solids, turbidity, COD, and TKN. The COD of leachate was 5600 mg/l, TKN of 562.36 mg/l, alkalinity of 330 mg/l, TSS of 1960 mg/l, TDS of 2865 mg/l respectively.

KEYWORDS: Dumping Yard; Landfill; Leachate; Chemical Oxygen Demand; Total Kjeldhal Nitrogen; Total Suspended Solids; Total Dissolved Solids.

A leachate is a liquid drained from MSW solid waste and during the rainfall. Leachate is a liquid that has dissolved or entrained environmentally harmful substances that may then enter the environment. It is commonly used term in the context of land-filling of putrescible or industrial waste in older landfills. Leachate is free to leave the waste and flow directly into the groundwater. As leachate first emerges it can be black in colour, anoxic, and possibly effervescent, with dissolved and entrained gases. When oxygenated it tends to turn brown or yellow because of the presence of iron salts in solution and in suspension.

The leachate contains toxic substances like wood waste, clothes, dyes which liberates ammonia, nitrogen. Leachate from MSW landfills typically has high values for total dissolved solids and chemical oxygen demand, and slightly low to moderately low pH. Leachate may contain many types contaminants, and if its not removed by treatment, these contaminants may be toxic to life or simply alter the ecology of receiving streams. Leachate should be treated before reaching surface water or ground water bodies. Because it can accelerate algae growth due to its high nutrient content.

MATERIALS AND METHODS

Sample Collection

The leachate used in this study was collected from a Srinivasapuram landfill dumping yard located in Thanjavur city. The age of leachate during sampling is 40 – 50 days. The large volume of samples were collected and stored in a container.

Characteristics of Leachate

The characteristics of leachate investigated using standard methods. The parameters analyzed are pH, electrical conductivity, turbidity, temperature, alkalinity, chemical oxygen demand, total kjeldhal nitrogen, total dissolved solids, total suspended solids. This table shows the testing results of Characteristics of landfill leachate ages 40 to 50 days from dumping yard.

Table I: Characteristics of Landfill Leachate

Parameters	Landfill leachate values
pH	8.24
Temperature	37°C
EC	960µmmho/cm
Turbidity	192.6 NTU
TSS	1960 mg/l
TDS	2865 mg/l
COD	5600 mg/l
TKN	562.36 mg/l
Alkalinity	330 mg/l

RESULTS AND DISCUSSION

Characteristics of Landfill Leachate Site Srinivasapuram, Thanjavur

Leachate characteristics, applied technologies and energy demand for leachate treatment were investigated through survey in different states of

[1]Corresponding author

Germany. Based on statistical analysis of leachate quality data from 2010 to 2015, almost half of the contaminants in raw leachate satisfy direct discharge limits. However, contaminants of concern remain COD, ammonium-nitrogen (NH_4-N) and BOD_5 with average concentrations in leachate of about 1850, 640, and 120 mg/L respectively. Concentrations of COD and NH_4-N vary seasonally, mainly due to temperature changes; concentrations during the first quarter of the year are mostly below the annual average value. Sudden changes in concentration of these two parameters, due to high correlations of around 0.8 with both COD and NH_4-N values which are possibly due to low heavy metal concentrations in leachate. Citation [1].

Table I. presents the average concentration of leachate of Srinivasapuram, Thanjavur is COD of leachate was 5600 mg/l, TKN of 562.36 mg/l, alkalinity of 330 mg/l, TSS of 1960 mg/l, TDS of 2865 mg/l respectively. The COD and nitrogen content of leachate were high when discharge into land surface its having difficulty of contaminating the underground water quality. The underground water in and around that area were severely damaged and if it continues the people may suffer from health effect in future. This increase in COD and TKN refers to high nitrogen content and toxic materials in leachate. This is because of seasonal changes and age of the leachate.

This can be treated using upcoming membrane technology. Membrane materials are quiet costly so we can go with natural fiber materials. These membrane materials come under Ultra filtration which may treat up to 70 to 80% of COD and TKN.

CONCLUSION

The present study contains results of landfill leachate characteristics. The average value analyzed is higher than the requirements given by local discharge water standards. The presented data indicate that the landfill leachate composition has a significant effect on treatability, COD of leachate was 5600 mg/l, TKN of 562.36 mg/l, alkalinity of 330 mg/l, TSS of 1960 mg/l, TDS of 2865 mg/l respectively the organic concentration like COD, TKN, alkalinity is high.

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