

Study of Domestic Wastewater by Using Phytoremediation Technology

“Bachelor of Engineering in Civil Engineering”



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(Approved by AICTE, New Delhi and Recognized by DTE, Maharashtra)

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Accredited by NAAC with A+ Grade

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Abstract:- The Phytoremediation technology summary report gives a quick of environmental remediation technology. This report is provided for information purpose only and it is based on study of various literature survey, various research paper. The information used in the preparation of this report was gathered from Internet. Phytoremediation uses plants and its roots to clean up, accumulate and treating the waste. The results of this project based on study of various literature survey. There are five basic types of phytoremediation techniques:

1. Rhizofiltration,
2. Phytoextraction,
3. Phytotransformation,
4. Phyto-stimulation,
5. Phyto-stabilization.

Keywords:- Phytoremediation Remediation Technology, Pesticides/Insecticides, Explosives, Nutrients, Surfactants, Ex-Situ Treatment.

I. INTRODUCTION

As we know that freshwater is a major resource available in earth. The primary water source is polluted due to the discharge of various harmful substances. Due to the effects of global warming there is increase in the water source in one side and scarcity in other parts such as agriculture. From above data, there is a need to improve the water quality to satisfy all the needs. Since natural water resources are limited so, there is need for the treatment of wastewater.

As we know that, huge quantity of sewage is generated in rural and urban areas. Due to less wastewater treatment plant large portion of this sewage remains untreated and left as it is to water bodies. In order to clean the rivers, it is necessary to clean the sewage i.e., mainly domestic sewage. Hence, it is very essential to reuse the wastewater for various purposes by using some advanced techniques such as Phytoremediation technology.

1.1 Advantage of Phytoremediation

- Low capital requirement
- Low energy requirement
- Environmental Friendliness
- Utilizes natural and renewable source

1.2 Application of Phytoremediation

The various application of phytoremediation are as follows :-

- It can be used in the treatment of domestic municipal sewage.
- Improving the quality of lake water.
- Industrial waste water.

II. MATERIAL

The different materials used for the development of phytorid bed are as follows:

1. Coarse Aggregate of 20 mm effective diameter: This aggregates are used for road construction which is used as a lower layer below the asphalt surface. Coarse aggregate was provided at layer of 200mm as base layer.
2. Fine Aggregate (Fine sand) of 2.36 mm size: The aggregate which are passed through 4.75mm sieve is called as fine aggregate. The use of the fine aggregate is to fill the voids present in the coarse aggregate. Fine aggregate was provided at middle layer of 200mm as middle layer.
3. Garden soil: Soil is a mixture of organic matter, minerals, gases, liquids, and organisms that together support life. The soil plays an important role for plant growth, for water storage, supply and purification. Darkened topsoil is also called as garden soil.

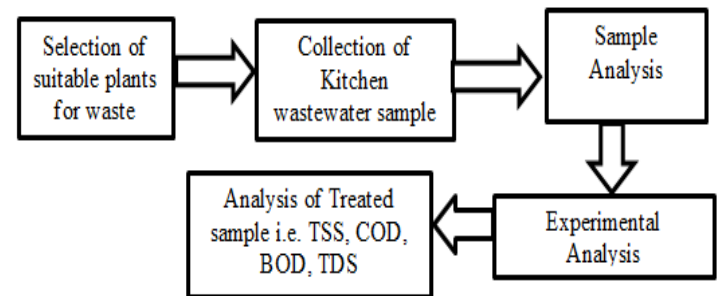
III. METHODOLOGY

First the sewage is allowed to pass through the bar screen chamber Then it is allowed to settle in the settling tank for some period. Then the sewage water from the settling tank is allowed to pass through the phytorid bed which contains various types of coarse aggregate, fine aggregate and soil. On the phytorid bed the plants were transplanted such as Eichhornia, Heliconia, and Pan Umbrella etc. which are major purifying factors in this Phytorid process. This plants survive and flourish on nutrients that are present in sewage, so they absorb the oxygen from atmosphere and send down to sewage from their roots hence increasing the oxygen content and also purifying the sewage in clean water. Now, the treated clean water would be discharged after a specific detention time of 72 hours. Plants which act as a purifier in this topic are sometimes readily available in our surroundings such as "Indian Shot" etc. but due to its incomplete know how such useful plants are wasted.

Now the treated water undergoes various processes such as pressure sand filter, activated carbon filter and ozonation system. Hence, the treated water can be used for irrigation, gardening, flushing tank etc.

3.1 Process

The process of Phytoremediation is given below with the help of flow chart as given below:



IV. OBSERVATION AND RESULTS

- By this treatment it results in the reduction of
 - BOD
 - COD
 - Total Suspended Solids
 - Heavy metal constituent
 - Improvement in the pH level and
 - Decreased rate of turbidity and hardness.
- This result meets the standards of the irrigation water needs hence, the essential nutrients which are required for the plant growth is obtained by this water.
- Thus, the phytoremediation technology require less area, less maintenance, economical and easy to construct.

V. CONCLUSION

Based on the above analysis, it can be concluded that phytoremediation technology is a type of constructive wetland which is used for the reuse of wastewater, which gives fair quality results. Hence, the treated water can be used for irrigation purpose and flushing the tanks etc.

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