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CHARACTERISTIC STUDY ON DOMESTIC WASTE WATER BY NATURAL ABSORBENTS USING MULTIMEDIA FILTER TECHNOLOGY

V. Anusuya*, R. Malathi*, P. Subash Kumar & S. Sunil Barath****

* Assistant Professor, Department of Civil Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamilnadu

** UG Scholar, Department of Civil Engineering, Sri Ramakrishna Institute of Technology, Coimbatore, Tamilnadu

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Abstract:

This project deals with the characteristics study on treatment of domestic sewage and utilization of treated sewage for irrigation can prevent pollution of water bodies and reduce the demand of fresh water in irrigation sector. Providing treatment facility for all polluting sources is difficult and also expensive. Hence there is pressing demand for innovative technologies which are low cost, require low maintenance and are energy efficient for water treatment. Filtration is a process for separating the contaminant from wastewater by passing through the porous media. Experimental study was carried out to upgrade the conventional treatment process by introduction of multiple media. An attempt was made to treat the domestic waste water generated at SRIT, Perur, Coimbatore, by using a lab scale filter media setup. The treatment process was undertaken along with several laboratory experiments. The lab-scale reactor was approximately designed. The reactor was packed with different combination of packing media such as sugarcane bagasse, coconut coir, rice husk. The treated sample was collected after 24 hours and 48 hours. BOD removal efficiency has been obtained. The performance assessment parameter such as COD removal, BOD removal, pH variation, Total solids, Dissolved solids, turbidity was adopted. Thus providing a economically feasible and eco-friendly technology to improve the quality of life of rural people.

Key Words: Multimedia Filter, Low Cost Absorbents, Biological Oxygen Demand, Chemical Oxygen Demand, Coconut Coir & Sugarcane Bagasse.

1. Introduction:

Water is considered as one of the most important nature in earth. It is one of the most essential things that is required for every living organisms. Water covers 71% of earth surface. On earth 96.5% water present in seas, 1.7% water present in ground water, 1.7% water occurs in nature as snow and glaciers. Safe drinking water is essential for human being. In order to develop a healthy and hygienic environment, water quality should be maintained within the respective standards. Source of Wastewater is obtained from combination of the domestic, industrial, commercial, agricultural activities. Wastewater obtained from various sources need to be treated very effectively in order to maintain a hygienic environment. In addition to this, disease causing bacteria will grow up in the stagnant water and the health of the public will be in danger. The principal aim of wastewater treatment is generally to allow human and industrial effluents to be disposed off without danger to human health and natural environment. The treatment of waste water depends on the character and quality of sewage and sources of disposal availability. The sewage after treatment may be disposed either into a water body such as lakes, streams, river, estuary and ocean or into land. It should not cause any effects in it. Because it may be used for several purposes such as conservation, industrial use or reclaimed sewage effluent in cooling systems, boiler feed, watering of lawns. Besides that, the purpose of wastewater treatment is to remove pollutants that can harm the aquatic environment if they are discharged into it. In aquatic environment, oxygen saturation plays an important role. Water is to have a maximum amount of oxygen dissolve in it Because of the deleterious effect of low dissolved oxygen concentrations on aquatics life, wastewater treatment engineers focused on the removal of pollutant that would deplete the DO in receiving waters. Waste water treatment can be classified into physical, chemical, biological process. Filtration is the process of removing bad contaminants like solid particles, suspended matter, microorganism from a liquid, by pass through a liquid into porous membrane. The process of filtration involves the flow of water through filter beds of sand and other low cost absorbents at low speed. This type of filter is known as slow sand filter and it is used in waste water treatment plants. In Multimedia filter there are different types of Medias are used as a filter beds. The removal of waste water contaminants depends upon the depth of the filter media. The main advantage of filtration process is to give high removal rate of waste water contaminants. In this filter technology, the filter media are low cost absorbents and it should not affect the environment after disposal. Filter technology is based on physical process to treat the contaminants like color, total solids, dissolved solids, and suspended solids, BOD, COD etc. Thus providing an economically feasible and eco-friendly technology to improve the quality of life of rural peoples.

2. Aim and Objective:

The purpose of the study should include the following:

- ✓ The vital objective of this study is to find the treatment efficiency of the domestic waste water by using multimedia technology
- ✓ To compare the test results of various parameter in the sample before and after filtration

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3. Materials Used:

Collection of Adsorbents: The adsorbents used for this study are sugarcane bagasse, coconut coir, rice husk was collected from the local market.

Preparation of Adsorbents: The sugarcane bagasse are washed with water to removal the colours, dust particles. Then it was kept in sunlight for 10 hours to remove the moisture present in the sugarcane bagasse.

Figure 1: Sugarcane Bagasse

Figure 2: Coconut Coir

Figure 3: Rice Husk

4. Experimental Setup:

Filter Design: The Filtration tank was constructed by glass material. Thickness of glass is 8mm. The Filtration tank size is 0.3 m long, 0.3 m wide and 1 m high. The total capacity of the tank is 90 lit/m. The total filter media depth is 0.6m. Collecting chamber is provided at bottom of the tank. Outlet pipe is provided to collect the sample after filtration

Filter Media: The filtration tank consists of compartment which is used to pack the filter media in a series. The compartment is packed with low cost adsorbents such as sugarcane bagasse, coconut coir, and rice husk. The depth of each filter bed is 0.2 m. The removal efficiency is increases with increasing filter bed depth. In filter media, sugarcane bagasse is placed as a top layer, coconut coir is placed as a middle layer and rice husk is placed as a bottom layer

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Filtration Process: The Domestic waste water was collected. The waste water made to pass through the filter. The water flows from top to bottom of the filtration tank. The flow of water is downward flow. The waste water flows form top layer to bottom layer in a downward flow. After filtration process the water was collected by collecting chamber. In the collecting chamber the outlet pipe is provided to with draw then sample

Figure 4: Filtration Tank

5. Result and Discussion:

In this study it was observed that the adsorbents materials such as Sugarcane Bagasse, Coconut Coir, Rice Husk may have good efficient in improving the physico-chemical characteristics of waste water. It is observed that the filter model will significantly in the removal of pH, Turbidity, BOD, COD, TSS, TDS. Hence it is found that the filter have effective removal of impurities for the domestic waste water. The result of this filter will be found to be an effective adsorbent filter for the removal of impurities from domestic waste water and the treated water use for Irrigation, Gardening, Car washing.

Table 1: Initial Characteristic Values of Wastewater

pH		8.2
Turbidity	NTU	10.4
BOD	mg/lit	400
COD	mg/lit	500
TDS	mg/lit	800
TSS	mg/lit	420
TS	mg/lit	1220

Table 2: Characteristic of Wastewater after treatment

Parameter	Unit	At 24 Hours	At 48 Hours
pH		7.8	7.4
Turbidity	NTU	5.6	3.1
BOD	mg/lit	115	25
COD	mg/lit	276	200
TDS	mg/lit	542	430
TSS	mg/lit	245	170
TS	mg/lit	787	600

5. Conclusion:

From this study, it can be concluded that the low cost adsorbents have good performance in removal bad contaminants from the waste water. The Multimedia filter process gives a good result in removal of contaminants like pH, Total Solids, Dissolved Solids, Suspended Solids, Biochemical Oxygen demand, chemical oxygen demand, Dissolved Oxygen from the effluent. It also concluded that the Multimedia filter has effective pre-treatment process of wastewater. The Low cost adsorbents have good performance in the treatment system. Hence this technology is Eco-friendly and cost effective.

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