

Domestic Grey Water Treatment Plant

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ABSTRACT—Reclaimed water can be defined as water generated in kitchens, showers, laundry, bathrooms, etc., except for toilets and urinals. The difference between reclaimed water and wastewater (black water) is the load of organic matter. Our work is related to reclaimed water filtration. The goal behind this project is to develop a practice of wastewater filtration and reuse it for a variety of purposes just for household chores. This project will help reduce the waste and occurrence of reclaimed water. Instead of wasting this gray water in the wastewater channel, instead of increasing the load of the urban sewer pipe, it is peaceful of sustainable development.

Keywords: Grey water, pH test, Rice husk, Paper waste.

I. INTRODUCTION

The main goal is to develop practices and training for reclaiming water by filtering it and using it in daily work. Like developing countries like India, India is currently facing a water crisis and drought, with daily human activities such as food preparation, washing, toilets, dishwashing and other household and industrial activities. You need a lot of water.

Miscellaneous drainage is supplied from sinks, showers, washing machines and bathtubs. Approximately 135 liters (35 gallons) of water are produced per person per day. Reclaimed water content varies by water source (kitchen, laundry, bathroom, etc.) and country. The amount of organic matter is much less than that of black water in the toilet, but the amount of heavy metals is about the same.

Reclaimed water is water from the kitchen, laundry and bathroom, except for wastewater from toilets and urinals. According to Prillwitz and Farwell (1995), reclaimed water is domestic wastewater that is not in contact with toilet water. In addition, they did not contain kitchen sinks, wastewater from the dishwasher, or wash water from dirty diapers in reclaimed water. Drainage from bathrooms, showers and washing machines is called light gray water. Reclaimed water, which contains more heavily contaminated waste from laundry, dishwashers, and in some cases kitchen sinks, is called reclaimed water. The important goal of this venture is to clear out the kitchen waste water and recycle it and reuse that water in special functions like housework, gardening, agriculture etc. The purpose of our venture is to lower the weight on sewers because of waste water and it additionally decreases the wastage of water and recycle it.

II. LITERATURE SURVEY

In various ways, a large number of papers are published on the grey water treatment in household applications they are

Rajarshi Kar, Oindrila Gupta [1] Explain the treated reclaimed water and recycle it for home use by recycling the water to minimize the use of fresh water and reduce the discharge of wastewater to the sewer. With this treatment, the water is purified and good results are sufficient. They pumped water directly into an overhead tank for reuse at home. In this attempt, the development of water recycling was attempted to minimize freshwater consumption and wastewater disposal to the maximum extent possible. We compared various qualitative and quantitative parameters of both raw and treated water. The results

of the treated water are sufficient to be pumped directly to the overhead tank for use.

In [2] Mayur A. Jirapure, Pranay P. Surana The author specifies a filter module for household reclaimed water. The test results are within the tolerances suggested by MPCB for various parameters. Reusing wastewater saves up to 64% of drinking water daily, reduces freshwater requirements, reduces wastewater production and minimizes environmental impact.

Also, in [3] Ita E. Uwidia, The authors show aerobic biological methods of kitchen water and sand bed filtration. We studied a process to reduce the pollution level of kitchen wastewater by aerobic biological treatment and sand bed filtration. Evidence from the study is that the treatment process has a significant reduction in several parameters, including a 60% reduction in total suspended solids, a 66.90% reduction in biochemical oxygen demand, and a 94.1% reduction in total bacterial count. Shows that a reduction has been achieved.

[4] Bhausahab L. Pangarkar, Saroj B. Parjane based on Design and Economics of Rural Sewage Treatment Plants This treatment technique is characterized by high potential for COD, TDS, TSS, total hardness, oil, and anion removal, so this study presents traditional rural areas. It can be seen as a viable alternative to the processing plant. And cations. The identified benefits are reduced energy requirements, reduced operational and maintenance costs, reduced freshwater pollution, reduced septic tank pollution, and highly effective cleaning and groundwater recharge. Therefore, this is an environmentally friendly, chemical-free, low-cost, imaginative rural development facility.

III. METHODOLOGY

As shown in Fig. (1), we created a medium water treatment module consisting of different layers of filter media inside a plastic module (container). The module consists of a simple plastic container divided into various layers such as aggregate, sand, paper and rice husks. Then pour a water sample from the top of the container and let the water drip through various filter media. At the bottom of the container is an outlet / tap from which filtered samples are collected for laboratory analysis. The sample results are offset against the government's wastewater emission standards. approval authority.

Grey water Sampling

In this study, miscellaneous wastewater from kitchen and sink water sources (mixed form) was

sampled and evaluated for physical and chemical properties. Samples of medium water sources were collected from the 01 House over a week. The sample was taken once a day. Samples were collected directly from a manual washbasin or sink, and kitchen water was collected from the kitchen sink.

A. **Screening:** Screening is a wastewater pre-treatment which aims to prevent coarse solids, such as plastics, rags and other waste. In screening process its remove all unwanted material from water.

B. **Aeration:** In this process, its remove objectionable taste and odour and also remove dissolved gases such as CO₂, hydrogen sulphide etc. This process is optional and it is not adopted in cases where water does not content objectionable taste and odour.

C. **Sedimentation:** The purpose of sedimentation is to remove the suspended impurities. Sedimentation is a process that removes solids that float and settle down in water. Plain sedimentation removes silt and sand particles etc. Sedimentation with coagulant removes very fine suspended particles and some bacteria.

D. **Filtration:** The process of filtration forms the most important stages in purification of water. Filtration removes very fine suspended impurities and colloidal particles that may have escaped from sedimentation tank. Micro-organism present in water are largely remove through filtration.

E. **Disinfection:** It is carried out to eliminate or reduced to a safe minimum limit, the remaining micro-organisms, and to prevent the contamination of water during its transit from the treatment plant to the place of its consumption.

F. **Miscellaneous Process:** These includes water softening, desalination, removal of iron, manganese, and other harmful constituents present in the water after all the above processes.

Design Procedure and material selection

Measures have been taken to design facilities to facilitate the reclaimed water treatment required to ensure reuse. In this way, more horticultural activities can be accommodated, especially in dry environments, and more importantly, overall environmental issues are addressed within the site of the wastewater source.



Fig1). pH meter reading

Material used: Kitchen wastewater, sand, aggregate, rice husk, alum, bleaching powder, paper waste

Methodology :

Collect grey water. It is contaminated with food particles, oil gaps and other waste. In the first step, it is removed from unnecessary particles present in wastewater, and then the wastewater is collected in the tank after adding two bleach powders to remove impurities of impurities. Stir out of gray existing bacterial water. Thereafter, the paper waste and the rice bowl of this water were passed in a second container with a layer of paper waste. Water that has passed through this layer can remove fats and oil after the sieve process. After this process, water flows

through layers of sand, fine aggregate and rice husks, making it easy to remove impurities remaining in the wastewater.

The wastewater is sent to another tank, to which a certain amount of alum is added, the taste and odor are completely removed, and suspended solids contained in the water are removed. Finally, it receives the filtered water and removes the largest percentage of oil, odors, tastes, suspended solids, etc. from the wastewater. Currently we use treated water for agricultural and horticultural purposes.

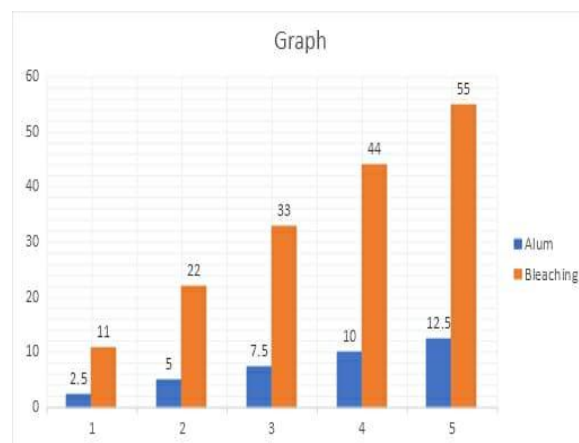


Fig 2) Alum & Bleaching Powder graph

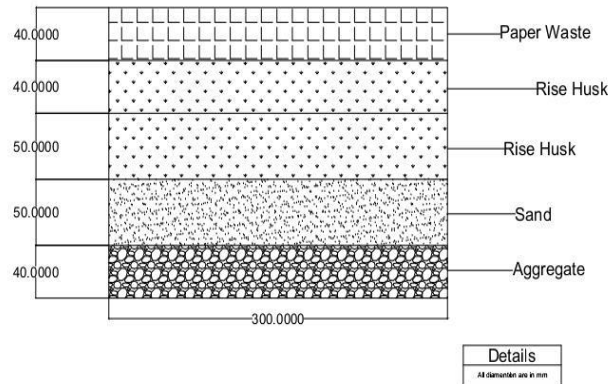


Fig 3) layers of treatment plant

B. Laboratory Analysis Physio-chemical analyses of the grey water collected were determined for the selected parameters:-

TABLE I. Characteristics of Grey water

Sr. No.	Characteristics of Grey Water (initial readings)	
	Parameters	Inlet Readings
1	Physical Observation	Turbid
2	Odour	Soapy
3	Turbidity	208
4	pH value	6.95
5	Chlorides	165
6	Nitrites	20.25
7	Total Hardness	198
8	Alkalinity	58
9	Permanent hardness	144
10	Iron	0.12
11	Fluoride	0.92
12	Total Solids Dissolved	475

TABLE II. Characteristics of Sample Grey water

Sr. No.	Characteristics of Grey Water (initial readings)	
	Parameters	Inlet Readings
1	Physical Observation	Turbid
2	Odour	Soapy
3	Turbidity	80.05
4	pH value	6.85

IV. CONCLUSION & FUTURE WORK

The water recycling is important because it allows us to reuse it for other beneficial purposes. This includes agricultural and landscape irrigation, toilet flushing etc. So our main purpose is depend on this circumstances. This process is reducing the impurities, oil, odour, taste, taste and pollution levels of grey water or kitchen wastewater using the rice husk paper waste and sand bed filtration.

If the wastewater can be treated in that way so that there is minimum cost is apply for the use of cleaning or any other purpose and due to natural treatment of wastewater there is no harm to the soil and agricultural purposes.

The future effort of this system is to treat wastewater for drinking, and it is economical for people to use this treatment method.

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