

GREY WATER REUSE FOR TOILET FLUSHING

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ABSTRACT

Water scarcity, poor water quality and water related disasters are three challenges related to current and future water resources. In mitigating these challenges grey water management can offer a viable solution. Water related disasters are the three challenges. This paper proposes a grey water Recycling system which we can use for treating the grey water generated from the kitchen drain, washing machines and bathroom drains. We can use this water for the purified water can be used to irrigate the plants grown in the greenhouse. Also, these non-potable reuse applications include industrial processes, irrigation, toilet flushing and laundry washing depending on the technologies utilized in the treatment process. Which reduces the amount of fresh water consumption and wastewater production.

Keywords: Filtration, Activated Charcoal, Grey Water, Reuse.

I. INTRODUCTION

Water is critical for all life on the earth. Rapid industrialization and urbanization has caused India to face a water crisis. Due to its high pollution density, the measure of grayish water generated per day is the measure of greyish water generated per day is equivalently high. The centralized drainage system cannot sustain high volumes of grey water generated per day. Thus this has rebounded to increase in the phase runoff of gray water posing healthy danger as the result of high pollution consistency a cute fresh water scarcities are endured. In order to resolve the extremity India has to look for indispensable water coffers which may include rain water harvesting, borehole drilling is veritably precious for utmost residents of per metropolitan agreement Rainwater on the other hand is seasonal and rain patterns have changed. Likewise, there's limited space left for storing huge capacities of water which can sustain the being high population for numerous months. Greywater is defined as waste water generated from the bathroom, laundry and kitchens. Nearly 70 percent of the water used in homes results greywater which can be treated using simple technology and reused. Waste water generally is made of black water and greywater. Greywater also known as sullage is nonindustrial waste water generated from domestic processes similar as washing dishes, laundry and bathing.

II. METHODOLOGY

Following are the procedure which we are followed in our process.

1. Selection of suitable site

We have selected a residential building having G+4 Structure situated in Thane, East. We collected grey water from bathroom drain, washing machine and kitchen drain.

2. Collection of Material

The materials we collected for making the filtration unit are

- Plastic container
- coarse aggregate
- Sand
- Charcoal
- Cotton

3. Cleaning of Material

We clean the material which we collected before filling it in the filtration unit.

4. Filling the Material in Model filtration unit

The filling of materials should be done in proper layers so we filled the layer in sequence as follows:



Figure 1

- Cotton
- Activated Charcoal
- Fine sand
- Coarse sand
- coarse Aggregate

5. Treatment Process

After filling all the clean material infiltration unit we put the grey water collected from the drains in the filtration unit. Here we can see that the before and after picture of the grey water sample passed through the filtration unit. The water after 15 minutes got filtered.



Figure 2: Before and After picture of grey water sample

III. TESTING OF WASTE WATER

A] PH

It is a negative scale used to specify the acidity or basicity of an aqueous solution. It is approximately the negative of the base 10 logarithm of the molar concentration measured in units of moles per litre, of hydrogen ions of pH wastewater is measured using pH meter, which measures hydrogen-ion activity and display pH value on the digital screen or by pH paper. pH can also be measured using pH paper in which the change of colour of pH paper compared with the colour scale given in the cover of pH paper and pH is calculated.

Table 1: pH of Grey Water Sample

Sr. No.	pH	Grey water Before Treatment	Grey water After Treatment
1.	Sample 1	10.12	6.8
2.	Sample 2	11.16	8
3.	Sample 3	10.18	7.4

B] Chemical Oxygen Demand (COD)

The Chemical oxygen demand (COD) is an indicative measure of the amount of oxygen can be consumed by reaction in a measured solution. It is commonly expressed in mass of oxygen consumed over volume of solution which in SI unit is milligrams per litre (mg/l). A COD test can be used to easily quantify the amount of organics in water. The most common application of COD is in quantifying the amount of oxidizable pollutants found in surface water or waste water.

Table 2: COD of Grey water sample

Sr. no.	COD	Grey water Before Treatment	Grey water After Treatment
1.	Sample 1	24	11.7
2.	Sample 2	21.8	11.5
3.	Sample 3	22.6	11.9

Average COD value of greywater sample after treatment is found to be 220 mg/lit .This treated water can be used for car washing, gardening etc. purposes.

C] Biochemical Oxygen Demand (BOD)

It is the amount of dissolved oxygen by aerobic biological organism to break down organic material present in given water sample at a certain temperature over a specific time period.

Table 3: BOD of Grey water sample

Sr. no.	BOD	Grey water Before Treatment	Grey water After Treatment
1.	Sample 1	5.2	2.9
2.	Sample 2	5.4	3.2
3.	Sample 3	5	3.3

D] Turbidity

Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. The more total suspended solids in the water, the murkier it seems and the higher the turbidity. Turbidity is considered as a good measure of the quality of water.

Table 4: Turbidity of Grey water sample

Sr. no.	Turbidity	Grey water Before Treatment	Grey water After Treatment
1.	Sample 1	160	88
2.	Sample 2	190	98
3.	Sample 3	180	94

E] Total Solid

Total solids are a measure of the suspended and dissolved solids in water Suspended solids are those that can be retained on a water filter and are capable of settling out of the water column onto the stream bottom when stream velocities are low.

Table 5: Total soild of Grey water sample

Sr. no.	Total Solids	Grey water Before Treatment	Grey water After Treatment
1.	Sample 1	1330	889
2.	Sample 2	1380	650
3.	Sample 3	1380	658

IV. COMPARING THE CHARACTERISTICS OF TREATED AND UNTREATED SAMPLE

Table 6: Comparison Results

Test	Before Treatment	After Treatment
pH	10.82	7.4
COD	5.2	3.13
BOD	22.8	11.7
Turbidity	176.67	93.3
Total Solid	1363.3	723.3

After comparing different characteristics of gray water with treated greywater, it has been observed that there is a change in values and the treated water can be used for different purposes.

V. CONCLUSION

Domestic wastewater requires a high level of treatment before disposal to satisfy the discharge standards prescribed by pollution control authorities to protect the receiving body. The water obtained from activated carbon filter is clear and cab be used for cleaning and flushing purpose The treated sample is analysed and compared with untreated sample and the characteristics like PH, BOD, COD, Turbidity and Total Solids are tested which shows a variation in values.

VI. REFERENCES

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