



## Recycling Of Grey Water Using Filter Of Dry-Fruit Shell, Activated Carbon And Vetiver Roots

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**Abstract:** In 21<sup>st</sup> century world as well our country is facing from problems of water scarcity. There is huge demand of water and sources of freshwater are depleting day-by-day. It is duty of every individual, society, organization to look at this problem seriously and find an effective solution in this matter. We can use the grey water as a source for fulfilling daily activities. The water from kitchen, laundry, bathroom, basin, sinks can be collected properly store, treat and allow to pass through layered filter of sand, aggregate, activated carbon and waste shells of dry fruit like walnut and pistachio. As different layers of material are from top dry fruit shells to vetiver roots at bottom. The odour and soapy foam problem which is biggest concern in grey water is solved This filter has proved efficient to reduced chemicals like BOD, COD, pH, TDS, Hardness. For better result it moreover depends upon detention time.

**Index term:** Grey water, Vetiver roots, Activated carbon

### Introduction

Water is an important element of human life. Without water we can't survive on earth. But due to heavy urbanization, changing lifestyle, and increasing in population the level of water is depleting day-by-day. It is a serious problem of mankind. To avoid such, man must look after the conservation of water practices and methods. One of method is reusing grey water. Recycled greywater can be used for other daily wateractivities including potable and non-potable uses such as toilet cleaning, car washing, gardening and landscaping street washing and also for ground water recharge. The major issues with greywater reusing is with public health approach, perceptions about using the same water again and again and undeveloped technology for the recycling option.

### Objective of project

- To study about the grey water pattern
- To suggest artificial layered filter of activated carbon, dry fruits shell, and vetiver roots.
- To check the suitability of grey water by carrying out laboratory test.
- To examine the chemical parameters of greywater and reuse filter water

### Literature review

A.D. Mande,2018This paper reviews about the detailed study on low-cost household water treatment methods. In this review paper there are various low-cost households water treatment methods are there like ceramic candle filter, silver impregnated pot filter and bio sand filter. In this there are various media used in this treatment methods like resin, activated carbon etc.

Adi Maimon, Eran Friedler, Amit Gross , 2014 The author concludes about using of greywater and its safety concerned for irrigation purposes, as using this water may be harmful to plants and vice-versa to the humans. It weighs about risks to humans due to different types of chemical parameters attained in the GW.

Omerod, K. J., & Scott, C.A.2013 ,The paper reviews about problem of water scarcity in near future, to avoid this drinking of wastewater standards are discussed. As we know in the coming decades, highly treated wastewater, known as reclaimed water, is slated to be a major element of municipal water supplies.. A survey is carried over 250 residents of Tucson, Arizona, for willingness to drink reclaimed water. The Results demonstrate that public acceptance of potable reuse is contingent on trust in the authorities to reuse—including water and wastewater utilities.

Pathan, A. A., Mahar, R. B , & Ansari, K. 2011The research is about the effect of flow rate and disc about the Rotating biological contractor (RBC) for treatment of GW. The usage of RBC is related to many factors rotational speed of disc, surface area of the media, thickness of biological film; quality and flow rate of influent. The study the performance of RBC is investigated at different flow rates and disk areas of media by introducing additional discs on the shaft of RBC. They concluded about how to increase efficiency by increasing Flow rate and changing disc area.

### Material and Methodology

A surveying work was carried in study area which is Judge quarters Dhule. Each house, flats, bungalows was surveyed regarding amount of daily consumption of potable water and average consumption was calculated

#### Kitchen grey water

As we know kitchen soaps are made up of high amount sodium to remove dark stains of utensil.

#### Bathroom grey water

The grey water contains oil, body dirt, hairs, heavy chemicals from soaps, shampoo

#### Washing area

It is area where clothes and sometimes utensil are washed. The soaps contain heavy sodium for remove strains from clothes.



Fig no.1 Sources of grey water Fig no2 layered filter

### Layered Filter

The grey water can pass through filter layers of dry-fruit shells, sand, aggregates, vetiver roots, and activated carbon. The filter water can be tested in laboratories for finding the chemical parameters. There is drastic variation in result before pre-treatment and post treatment. The main concern of odour of grey water, foam or leather, soapy material and harmful chemical are reduced.

#### Material in filter

The filter at bottom has 1.5 kg aggregates to have strong foundation and restricts dirt to pass in bottom. The vetiver roots are spread evenly on this to improve odour issues. Above this there layer of Activated carbon which helps to remove turbidity and other fine chemicals. Also, there 2 kg of sand at top to avoid fines and oil grease to pass towards bottom. The impurities are got stuck to sandlayer. At top there is pistachio and walnut shells are spread to restrict the foam and soapy water

**Testing of filter** Nearly 2 litre grey water sample is taken carefully from kitchen, bathroom, washing area. The colour of sample is pale yellow. Afterwards the water is allowed to passed through filter nearly 5-8 mins the sample is allowed to detent with layers of filter and finally drain water is again collected in plastic dispenser. The filter sample is tested through various lab tests. The suitability and acceptability of this filter tested water is check. All lab tests are carried on raw grey water sample and also on one which is passed through layer filter.

## Results

Parameter of waste water	Test method	Pre-treatment results
pH	APHA 4500 H+ Electrometric method	7.26
Total Dissolved Solid(mg/l)	APHA 2540 C	4122
Total Hardness(mg/l)	IS:3025 (Part 21)-2009	466
Total suspended solid	APHA2540 D	1214
Total Alkalinity(mg/l)	IS:3025 (Part 23) - 2003	360
Chloride (mg/l)	APHA 4500 CL- B	1629
Turbidity(mg/l)	IS:3025 (Part 24)-2009	10
Fluoride(mg/l)	APHA 4500 F	0.087
COD(mg/l)	IS:3025 (Part 58)	1086
BOD(mg/l)	IS:3025 (Part 44)	424

Table no.1 Pre- treatment result

Parameter of waste water	Test method	Post-treatment results
pH	APHA 4500 H+ Electrometric method	8.10
Total Dissolved Solid(mg/l)	APHA 2540 C	874
Total Hardness(mg/l)	IS:3025 (Part 21)-2009	376
Total suspended solid	APHA2540 D	179.5
Total Alkalinity(mg/l)	IS:3025 (Part 23) - 2003	248
Chloride (mg/l)	APHA 4500 CL- B	139
Turbidity(mg/l)	IS:3025 (Part 24)-2009	80
Fluoride(mg/l)	APHA 4500 F	0.58
COD(mg/l)	IS:3025 (Part 58)	781
BOD(mg/l)	IS:3025 (Part 44)	300

Table no. 2 Post treatment result

After comparing results of both the pre and post analysis it was founded that pH was increased and all other parameters like Turbidity,TSS,TDS, BOD, COD, Fluoride, Alkalinity, Hardness all were decreased.

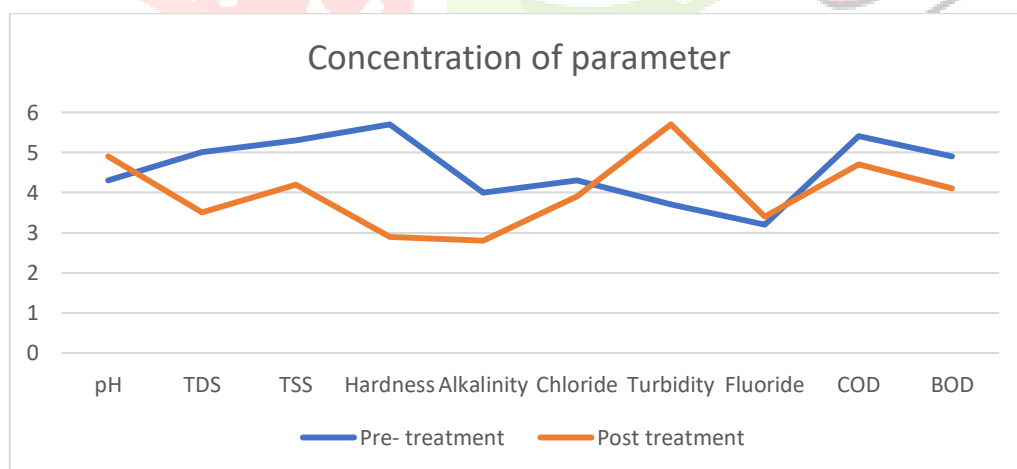


Fig no.3 Concentration of chemical parameters

## Conclusion

In above study we surveyed the area and average consumption was calculated. Later sample was collected and lab tests were carried. The result shows that using layer filter all chemical parameters were reduced. This shows that we can use this water for other daily activities like gardening landscaping, car washing, ground water recharge. Using this water take us towards fulfilling some demands like gardening, toilet flushing, car washing etc. Due to which problems like scarcity, ground water table level depleting gets resolved by somehow. It will be a sustainable approach and help for mankind and future generations

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