

GREYWATER USED FOR GARDENING BY CORN WATER FILTER

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ABSTRACT

The issue of Greywater management which is defined as all sources of domestic wastewater excluding toilet. Wastewater is gaining more and more importance especially in developing countries where the improper waste management is of the most important cause for environmental pollution as fatal diseases. In recent years not only the threats of improper Greywater Management have been recognized there is an increasing international recognition that Greywater reuse, if properly done, has a great potential as alternative water source for purposes such as irrigation and others. The main barrier for wider and faster dissemination of suitable Greywater Management system on household level is the lack of knowledge and experience in that field especially in development countries. Scientific knowledge is sparse regarding Characteristics and adequate Greywater treatment system allowing a proper and safe disposal or reuse of Greywater. The main purpose of this project is to present the current state of the art Regarding about Greywater management. In this project for the filtration of Greywater we used the corn cobs because of their advantages and features. Corn cobs are one of the most plentiful and important agricultural wastes in Maize cultivation. Thus, a matter of primary concern is the economical and efficient utilization of these corn cobs for a purpose. As they are poured, they can be used as water filter there are data collection and case studies are presented where Greywater treatment system is successfully applied.

Keywords: Greywater, Greywater management, filtration, environmental pollution.

INTRODUCTION

The world is not running out of water. The real challenge is to provide enough clean water to a rapidly growing global population (and the attendant demands that come with growth: more energy, more food, more industry, and more consumption). Increasingly irregular weather patterns and natural disasters only exacerbate the situation. Lack Of treatment options lead to two problems: not treating wastewater (i.e. sewage) before discharging it into waterways pollutes the source, often rendering the water unusable for drinking. The water intended for drinking is withdrawn from these same sources, and again not adequately treated, creating significant public health problems. 21% of communicable diseases in India stem from unsafe water. According to India's Central Pollution Control Board, the country has an installed capacity to treat only about 30% of the household waste it generates. The waste is released into open drains or straight into the ground. And just two cities, Delhi and Mumbai, which generate around 17% of the country's sewage, have nearly 40% of its installed capacity.

The main objective of our project is to search for a cheap method of cleaning waste water from domestic sources by utilizing one of the most unutilized agricultural wastes. The present study is based on the scientific principle of "Adsorption" by immobilizing the contaminants with the help of corn cobs. And an attempt

was made to clean of the most precious natural resources, Water. In this chapter we study about grey water and its characteristics and impacts. This is help for our treatment system.

The scope of this study focuses on evaluating the effectiveness of a corn water filter in treating greywater for use in gardening applications. Greywater, which includes wastewater from domestic activities such as laundry, dishwashing, and bathing, represents a significant source of non-potable water that can be recycled for irrigation. However, the application of greywater directly to plants may pose risks due to the presence of contaminants such as soap residues, chemicals, and microorganisms.

LITERATURE REVIEW

Characteristics of greywater

The characteristics of grey water are highly variable and depend upon availability and consumption of water, food habits, life style etc. In this literature, the characteristics of grey water were found to vary highly from one household to other household, complexes to community centres, and from one geographical location to another location.

- 1. Physical Characteristics:** - Colour- grey colour, Odor- musty and has a solids content of about 0.1%. The solid material is a mixture of faces, food particles, toilet paper, grease, oil, soap, and salts, metal. Detergents, sand, and grit. The solids can be suspended (about 30%) as well as dissolved (about 70%). From a physical point of to, the suspended solids can lead to the development of sludge deposits and anaerobic conditions when discharged into the receiving environment.
- 2. Chemical Characteristics:** - It contains heavy metal and toxic compounds etc. such as lead, cadmium chlorides, sulphur. In Greywater higher portion of dissolved solids than suspended solid are present. Gases commonly dissolved in wastewater such as hydrogen sulphide, methane, ammonia, oxygen, carbon dioxide and nitrogen, the first three gases result from the decomposition of organic matter present in the Greywater.
- 3. Biological characteristics:** - Greywater contain many pathogenic organisms which generally originate from humans who are infected with disease or who are

carriers of a particular disease. And contains various types of micro- organisms.

Impact of Greywater

- 1. Impact on Environment:** -Excess nutrients may run-off or leach through the soil to enter waterways and aquifers, resulting in algal blooms or other water quality issues, some types of detergents and optical brighteners are slow to bio-degrade and may persist in the environment for many months.
- 2. Impact on soil:** -If Greywater is not filtered in some way to remove suspended solids and organic matters, pore spaces in soil can become blocked. Bleaches, disinfectants and germicides should be avoided as much as possible as these chemicals will kill soil microorganisms and seriously affect soil health.
- 3. Impact on plants:** -Too much Greywater application continuously to one area may cause water logging of roots, inhibiting plant growth and even causing plant death. You may find your plants looking unhealthy or there is evidence of pests and disease on the plants or even obvious decolourisation of foliage.

Needs to Clean Greywater

- It saves potable water.
- Use less of our valuable potable or fresh water and save thousands of litres of drinking water.
- Reduce the impact on natural water resources by reducing water consumption. Ensure a constant water supply for the garden.
- Have a satisfaction of taking responsibility for efficient use of valuable, finite resources.
- Reduce the flow to the sewerage system, thereby reducing water treatment costs.
- Hair from the bath and shower can cause pipe and pump blockage if it is not filtered.

REUSE OF GREYWATER

- Reduces fresh water requirement
- Reduces sewage generation

The amount and quality of Greywater will in part determine how it can be reused. Irrigation and toilet flushing are two common uses, but nearly any non-contact use is a possibility. Toilet flushing can be done either by direct bucketing or by pumping treated

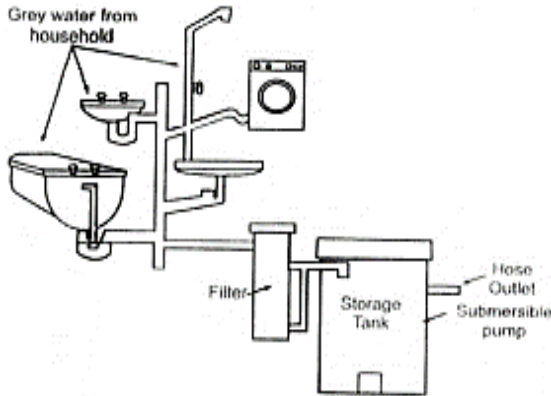


Fig 0: Diagrammatic Representation of Household Grey Water Generation. Greywater to an overhead tank connected by suitable piping to the toilets. Possible uses of treated Greywater are presented in table

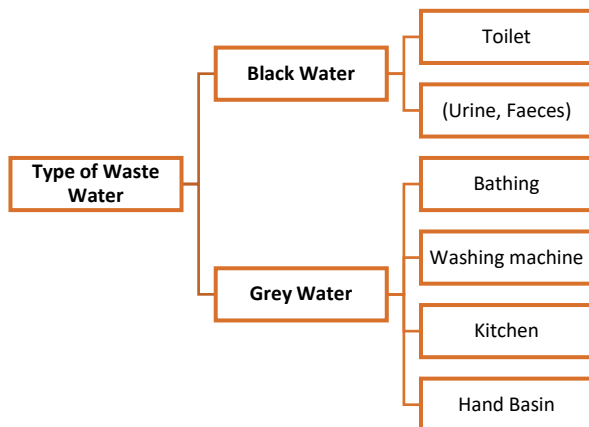


Chart. 1: Sources and type of waste water

METHODOLOGY

Material used

- I. **Greywater:** -Greywater is the wastewater generated in the bathroom, laundry and kitchen. Greywater is therefore the component of domestic wastewater, which has not originated from the toilet or urinals.
- II. **Corn Cobs:** -The most important part of our filter media is corn cobs. Corn is a major crop plant, every part of corn which is utilized except cob. It contains

more amounts of hemicelluloses i.e. they cannot degrade easily so what to do with cobs? People either they are through it or burnt it. It is found that animals do not eat cobs. If they are eaten to it, those effect on their digestion system. If we burnt it even there more pollution and causes global warming. But there are also good features of corn cobs if we use as a filter media i.e., we are chosen for these our project.

III. **Collection of corn cobs:** -The corn cobs were collected from local farmers. washed thoroughly with water, sun dried for one month, then they are cut into longitudinal section and small pieces and ground to powder and burnt in suitable condition to form activated charcoal.

IV. **Sand:** -sand is the loose granular material which is formed due to the disintegration of rocks. The composition of sand varies, depending on the local rock's sources and condition but the most common constituent of sand in inland continental settings and non-tropical coastal settings in silica, usually in the form of quartz. Sand filters are mainly used for water purification for treating the raw water. While using sand as filter media. Two important things are to be kept in mind: sand grain size and sand bed depth.

V. **Fabricated filter:** -He filters was fabricated as per requirement using locally available materials.

VI. **Activated charcoal:** -In this experiment we used activated carbon obtaining by corn cobs. The aim to choose the activated carbon from corncobs is their great efficiency for removing heavy metal from polluted Greywater. According to IMMT (Institute of Minerals and Materials Technology) Bhubaneswar. It is found that if pH of substance is increase and electrical conductivity is increase then the amount of capacity of adsorption also increases

Preparing Filter Setup: -

1. Corn cobs were washed thoroughly and then dried for one month,
2. Then com cobs were cut into longitudinal sections. smaller section, powdered form and charcoal was also prepared.

3. Sand and fabricated fibre is also used as a filter media.
4. Further these different forms of corn cobs were arranged in a sequence in arranged manner.
5. Meanwhile we began construction of a filtration system for experiment in which used the corn cobs.

Construction of reactor with five VC boxes

Rector 1: whole pieces of corn cob (approximate size 9cm to

Rector 2: Com cobs cut into longitudinal section pieces trap the suspended particles.

Rector 3: Com cobs cut into one-inch small pieces trap smaller grains.

Rector 4: Corn cobs powdered into granular form adsorb gasoline and oil.

Rector 5: Corn cobs burned into a blackened charcoal like material soak up colour dyes and lead and Other harmful toxic elements. And also, sand is used in this box to grabbed remaining chemical toxic, both organic and inorganic.

Procedure for Total Solids

- 1) **Sample Collection:** Collect a representative water sample in a clean container.
- 2) **Sample Preparation:** Filter the water sample through a pre-weighed glass fibre filter to separate the suspended solids from the water.
- 3) **Drying the Filter:** Dry the filter containing the suspended solids in an oven at 103-105°C (217-221°F) until a constant weight is achieved.
- 4) **Calculations:**
$$\text{Total Solids (mg/l)} = \frac{(\text{Weight of dried filter} - \text{Weight of empty filter})}{\text{Volume of water filtered} \times 1000}$$

Procedure for Total Suspended Solids

- 1) **Sample Collection:** Collect a representative water sample in a clean container.
- 2) **Sample Preparation:** Filter the water sample through a pre-weighed glass fibre filter or a filter with a known pore size to capture suspended solids.
- 3) **Drying the Filter:** Dry the filter containing the suspended solids in an oven at 103-105°C (217-221°F) until a constant weight is achieved.
- 4) **Calculations:**
$$\text{Total Suspended Solids (mg/l)} = \frac{(\text{Weight of dried filter} - \text{Weight of empty filter})}{\text{Volume of water filtered} \times 1000}$$

Procedure for BOD

- 1) **Sample Collection:** Collect a water sample in a BOD bottle, ensuring that no air bubbles are trapped.
- 2) **Initial DO (Dissolved Oxygen) Measurement:** Measure the initial dissolved oxygen content in the water sample using a dissolved oxygen meter.
- 3) **Incubation:** Seal the BOD bottle to prevent the exchange of gases with the atmosphere and incubate the sample at 20°C in the dark for 5 days.
- 4) **Final DO Measurement:** After 5 days, measure the dissolved oxygen content again.
- 5) **Calculations:**
$$\text{BOD} = \text{Initial DO} - \text{Final DO}$$

Procedure for COD

- 1) **Sample Collection:** Collect a water sample in a COD vial.
- 2) **Chemical Oxidation:** Add a strong oxidizing agent, such as potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$), to the sample.
- 3) **Digestion:** Digest the sample at high temperature (usually 150-170°C) for 2 hours in a reflux condenser.
- 4) **Cooling:** Allow the sample to cool down to room temperature.
- 5) **Colorimetric Measurement:** Measure the colour intensity of the sample using a spectrophotometer at a specific wavelength (usually 600 nm).
- 6) **Calculations:** Calculate COD using the calibration curve obtained from standard solutions.



Fig. 1. Domestic sewage (greywater)



Fig. 2. corn cobs



Fig. 3. Filter Media by using corncobs



Fig. 4: activated corn cobs



Fig.5: longitudinal section of corn-cobs

RESULTS & ANALYSIS

The overall performance of filter was good. After collecting the samples, the two containers were marked as “Raw” and “Filtered” and the samples were sent to Water quality Testing Laboratory, Nagpur, India for testing. The test results were obtained after 07 days. It is found that simple filtration technique helps to achieve an improvement in parameters of the raw waste-water. It has removed hardness causing salts, detergents, odour and heavy metals considerably. pH level, TS, TSS, BOD and COD values of filtered waste-water improved by 11.5%, 38.03%, 64.26%, 57.57 and 46.98%, respectively. Filtered waste-water was clearer and contained lesser impurities than the raw waste-water. Filtered waste-water can be used for watering household plants as the BOD and COD levels are better than raw grey-water.

CONCLUSION

It was observed that most of the coloured substances present in the effluents are adsorbed in the charcoal layers. The suspended particles are adsorbed in the chaff layers of both long sections and pieces of corn cobs. Maximum adsorption of gasoline waste was found in the powdered corn cob layers. The rate of adsorption

RESULT				
S r. N o	Tests	Raw Waste Water	Filtered Waste Water	Improve d in Percenta ge
1	pH	8.7	7.7	11.50 %
2	Total Solid	944 mg/l	585 mg/l	38.03 %
3	Total Suspended Solid	568 mg/l	203 mg/l	64.26 %
4	C.O.D.	502 mg/l	213 mg/l	57.57 %
5	B.O.D.	249 mg/l	132 mg/l	46.98 %

was directly proportional to the surface area of the adsorbents. The treatment method is valid for treatment of grey water. It is found that if, corncobs are not properly sundried then it gets decay and filtration Of Greywater may not do. This study reveals a novel and cheap method of cleaning waste water from domestic sources by utilizing one of the most under-utilized agricultural wastes. present study is based on the scientific principles of "Adsorption" by immobilizing the contaminants with the help of corn cobs. Corn is a major crop plant, every part of which is utilized except the cob.

In this project an attempt was made to utilize this less-utilized plant part to clean one of the most precious natural resources, water. This system has proved that "use of natural resources" to treat onsite wastewater. It is the dynamic option which can directly connect the masses of public. The Treated water has a wide range of applications as a replacement of freshwater resources for non-consumptive uses. It is very helpful for people to use this technique to recycle greywater since it is economical and simple in construction. And the recycled water can be used for gardening, toilet flushing, power plant coolant, laundries, vehicle wash, etc. This method is eco-friendly without use of special equipment's and electricity, with minimum operational and maintenance cost

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