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WATER FILTERATION USING THE COCONUT SHELL AND NEEM LEAF

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Abstract:
The need for clean water in people's daily lives has made water quality a major problem today. Water can be improved in a lot of ways. In order to protect public health, water filtration technologies have advanced during the past few centuries in rural areas, home to more than a billion people. Nobody on the earth has access to safe drinking water that is free of pathogens. India is one of the populated countries where the impoverished cannot afford to carry around a portable, high-quality source of pure water. A collection of locally sourced filters is used to treat surface water. In the investigation of media to eradicate turbidity, color, and germs, the efficacy of single media and dual media was assessed.
In addition to minimizing this issue, a long-term solution is required. However, using basic techniques to clean drinking water is becoming increasingly difficult in rural places. Furthermore, the government is overburdened with this problem. In rural areas, the government works on a water cleaning program. However, this kind of strategy incorporates contemporary methods of purifying water, such as online pressure filters or water treatment plants (WTPs). The government provides the initial funding for these advanced techniques, but upkeep is often needed once they are put into place. The government does not have the necessary funding for this upkeep. Due to this, gram panchayats and other local government entities are responsible for paying for all maintenance costs. However, such organizations are unable to generate enough money to continue running the program, so it is abandoned and people continue to drink tainted water. Since it poses a serious risk to their health, it is crucial to create practical and affordable methods for purifying drinking water now.
We are developing a cost-effective water filtration filter using neem and coconut shell as a result of this.

Keywords: Filter bed,wate water,coconut shell.

I. INTRODUCTION

Along with the effluent from all distilleries, the dairy industry, the manufacture of vegetable oil, and other businesses, domestic waste water is also dumped directly into the Krishna River. Rivers receive industrial waste products in liquid form. The use of chemicals in our farming practices, which drain rainfall into rivers, together with fertilizers and pesticides, is a contributing factor to river contamination. Pollution is increased when household waste is thrown into rivers. Towns and cities grow in population along with it. Studies show that agricultural waste and industrial wastewater have contaminated practically all of India's rivers. Nowadays, the majority of these rivers function as sewage drainage networks.
In addition to minimizing this issue, a long-term solution is required. However, using basic techniques to clean drinking water is becoming increasingly difficult in rural places. Furthermore, the

government is overburdened with this problem. In rural areas, the government works on a water cleaning program. However, this kind of strategy incorporates contemporary methods of purifying water, such as online pressure filters or water treatment plants (WTPs). The government provides the initial funding for these advanced techniques, but upkeep is often needed once they are put into place. The government does not have the necessary funding for this upkeep. Due to this, gram panchayats and other local government entities are responsible for paying for all maintenance costs. However, those organizations lack the necessary funding to carry out the programs in the future, so they are abandoned and people continue to drink tainted water. Since it poses a serious risk to their health, it is crucial to create practical and affordable methods for purifying drinking water now.

We can get samples for this project from the Koparde Haveli village, which is close to the Krishna River. Situated on the same riverbank as Karad town, Koparde Haveli village is close by. Because of this, the river's water needs to be purified because it is contaminated. There is a jack well in the riverbank of Koparde Haveli hamlet where raw water is extracted for drinking and other uses. In our college's lab, we may gather a sample of the water and conduct certain code-based tests. Following those entries, every raw water test result. We can design the filter and make the filter model over the course of a few days. Following that, we can filter the raw water, test it in a lab, and determine whether or not it is safe to drink.

Millions of people still depend on this tainted river water, making polluted filthy water a serious health concern. Water filtration is essential to prevent many diseases and lower the danger of contamination from storm water recharge. As a result, by constructing water treatment facilities in India, the federal and state governments are working to ensure that society has access to enough clean drinking water. The primary purpose of fast sand filters in India is to eliminate colloidal and suspended particles. By using various sand layer configurations, the water particles are removed during filtering more quickly. Sand filters are a cheap approach that are frequently used in industries to treat wastewater and remove impurities from water. The early and late phases of the filtration process degrade, which impacts the quality of the filtrate following countercurrent washing. Furthermore, there are two effects that coconut shells have on medium during filtration. The "multi-media filter covered with crushed coconut shells and neem leaves" design seems to be more practical, cost-efficient, and long-lasting. It enhances filtration performance by eliminating high turbidity, increasing filter activity, lowering the need for frequent backwashing, and improving filtration rate. As a result, it is more suitable for ingestion and other applications. An intriguing substitute for producing drinking water is the utilization of local materials as filter media, either as rapid or slow sand filters. They hardly ever have skilled technicians on hand to operate traditional quick coagulation sand filters effectively. climate, labor, land, and locally available materials; no need for chemicals. It promotes the use of slow sand filters as a low-cost surface treatment technique.

II. LITERATURE REVIEW

Guyer (2009) documented the employment of geotextiles in drainage and pavement applications. This study demonstrates that because geotextiles have a lower height area than traditional covering materials, they are more effective. Drainage effectiveness is decreased as runoff is concentrated by permeable materials. When the filter medium comprises finer particles that are most appropriate in terms of availability and particle size criteria, pipe covers can be useful. In this instance, the geotextile serves to cover the pipeline's holes and stop dike penetration. The flow through the geotextile that enters the pipe will be significantly more effective if it can split from the pipe surface by a little amount. One easy way to do this is to use a perforated tube with a hole in the concave section of the folds made of corrugated plastic.

Geotextiles and granular filters were used by Kalinovich et al. (2008) to treat PCBs (polychlorinated biphenyls). In order to remediate PCB-contaminated water and reclaim land, surface reactive and permeable barriers have been applied in a remote area in the Canadian Arctic. In July 2003, the first barrier system was put in place. Geotextiles alone might not be sufficient for this specific Arctic barrier system, according to suggested preliminary field and laboratory study, because of issues with clogging and survivability (particularly the effects of strong UV and freeze-thaw cycles). Subsequent research in the field and in the lab showed that granular materials can hold onto most PCB-contaminated soils without sacrificing hydraulic performance, but the fine has escaped. Extensive laboratory column testing has shown that nonwoven geotextile filters can be successfully applied with a granular permeable reactive barrier system.

Gidde et al. (2008) have out studies on the use of herbal coagulants in rural water treatment to remove turbidity from betonies clay. In contrast to cities, where a considerable portion of the population uses water guards and purifiers, the rural population is growing as a result of contaminated water sources brought on by a lack of funding and other pressing necessities. Thus, it is imperative that while increasing the focus on fortifying the source of drinking water, concurrent actions be undertaken to guarantee its quality. The availability of ecologically safe equipment for its purification and acceptance is guaranteed in rural settings. This practical research effort demonstrates that it is possible to purify murky water to the same degree as imported and used chemicals when buying natural items from local villages. Moringaoleifera - alum blend has proven to be a good substitute for alum, clear in addition to being a natural product, it is readily available and has a high price effective. Benefits are observed by introducing Moliere seeds. Primary coagulants and coagulation adjuvants have the potential for use in coagulates turbid water with a high turbidity removal rate, from 89 to 99%. Combined use of Moringa oleifera with alum has been shown to save between 40 and 60 D44 alum.

According to Lee et al. (2007), the drawback of traditional procedures that combine filtration and sedimentation is their lengthy residence times. This is mostly because of flocculation and the two-hour settling period. Fiber filters have been studied and employed in research on filtering for the manufacture of drinking water. They are designed for the tertiary treatment of biologically treated wastewater. Rather than using a filter with an inline coagulation function, flocculation and sedimentation were accomplished using fiber. A tiny amount of coagulant (1 to 3 mg/L) is injected online and multiple filter speeds ranging from 60 to 100 m/h are used to estimate the newly built filter. Through these experiments, it has been proven that fiber filter design is very effective in removing particles during filtration speed of 60 m/h (1500 m3/d) and dosage of 1 mg/L coagulant, and these are considered optimal operating conditions.

Mahvi et al. (2007) evaluated total coliform removal and turbidity water in a continuous sand filter. Continuous filters are one type and filter, will operate without interruption during backwashing and it also accepts high levels of suspended solids in the material stream. Dirty sand is continuously removed from the filter bed, washed and recycled No interruption to the filtration process. Different water samples are available quantity of turbidity enters through the water supply pipe and is delivered to the filter. A central column extends from top to bottom of the 1000 m3/day pilot plant built with large-scale water treatment plants have been used for this purpose. Four levels sand material depending on the grain size and thickness used. This research results in either a reduction in the number of filters or an increase in the number of settings capacities is at least doubled. Economic income is earned 15 thanks to reducing the disinfection dose as well as reducing the amount of filter sand material. Filter run time increased by 2-3 times, shown higher yield of water supplied and less quantity given backwashing is required. Above all, the water produced is of very good quality. Meets the most demanding requirements and enhances health limit sand filters have been proven to perform well under a variety of operating conditions turbidity and filtration rate of the branch stream.

Ong-Yeon Cho (2005) carried out research on the use of an aerated granular filter for iron removal. Anthracite coal is used as a medium in laboratory-scale trials to remove iron from artificial raw water using artificial filters. There is media that filters. The primary finding is that, rather than being a biological activity, iron oxidation and removal by aeration filters are primarily catalytic chemical reactions. Furthermore, removing iron has little impact. efficiently in the absence of ventilation. At slightly acidic pH values, iron removal is highly efficient. Ferrihydrite, or iron oxide stuck to the support's surface, is known to catalyze iron oxidation, as demonstrated by Mossbauer spectroscopic investigation using a twelfth filter. Water is directed through an external pipe into the column by a foot radial distribution arm. Polluted water flows upwards and bed. The water raises cleanliness in the upper part of the tank, and finally, it overflows the spillway and seeps into the drainage pipe. In this research, continuous sand filters were studied to determine effective disinfection besides removing turbidity. The results show the filtered water is of high quality and the turbidity is reduced 95.5%. Filter operation test shows removal the coliform and microbial colony rates were 99.67% and 98.99 D44 respectively.

The Monte Carlo simulation of a water treatment system (MCS) was assessed by **Gupta et al. (2005).** The approach for assessing the reliability of water treatment plants (WTPs) by simulating desired effluent quality using Monte Carlo techniques is developed and presented in this paper. WTP is optimized using nominal values for the parameters of the model and input variables (i.e., water viscosity, bulk density, and clarifier). One 50,000 m3/day has been used to apply and illustrate this strategy. Conventional wastewater treatment facilities handle raw water with 200 mg/l of suspended particles. The reliability of this mill has been proven 95.24 has been calculated on parameters using 5000 MCS tests and therefore not reaching the desired water quality standards by 4.76% due to the uncertainty of the variables.

Vitaly et al. (2005) studied the removal of cryptosporidium pharmacists by rapid sand filtration with flocculation filtration on ballast and intermediate wash. This study demonstrated that the addition of ballast the seeds systematically reduce the frequency and duration of ripening sequence is based on the hypothesis that kaolin is partially positively charged particles can adsorb on the surface. Parvum follicles and neutralization 17 their negative charges. The proposed concept was successfully developed in a weighted flocculation filtration technique is used to improve removal of inorganic particles and parvum follicle.

Going through the available literature it was understood various method & parameter are required for characterization of the drinking water. Various types of water of water filter, removal of dissolved minerals and treatment plant. Drinking water included changes in physical properties such as pH, colour, turbidity etc. Its removal is a chaotic process & therefore dissolution minerals evaluate. The filtration efficiency or effectiveness of any filter.

III OBJECTIVES OF INVESTIGATION

- To conduct a field survey and analyses the current water treatment facility.
- Evaluating the water quality and the level of contamination based on experimental investigation.
- Designing and Constructing in RSF for Household
- Analyzing Water Quality Parameters of RSF

IV METHODOLOGY

The purpose of the study is to determine how effective background filtration is as a water treatment technique, with an emphasis on its use in a particular study location. The goal of the research has been meticulously pursued.The region that was chosen for this research study has serious problems with water quality, as seen by the levels of turbidity. To obtain pH data for this study, water samples will be taken from a variety of sources within the designated study area. These samples will undergo a controlled laboratory analysis to ascertain. the original standards for water purity. In these trials, a filtration system that is specifically designed for the conditions of the study location will be built utilizing the right materials and configuration. An essential component of this research is the costing, which will provide light on the viability and sustainability of background filtration implementation in the selected study area.

a) Study Area:

For this project we can collect the samples of village Koparde Haveli located near Krishna river bank. The Koparde Haveli village is near to the town Karad located at same river bank. Due to that reason the river water is polluted, so need to purify this water. In Koparde Haveli village having jack well in river bank for pull out raw water for all purpose including drinking water. We can collect the sample. But as per discuss in introduction part now days in rural areas its big issue to purifying drinking water with simple technics. Also, government have an over burden of this issue. The government gives efforts for water purification scheme in rural areas. But such scheme includes the modern technics of water purification like a water treatment plant [WTP], or online pressure filter. Such modern technics government gives initial funds but after implementation of such technics there have a some frequently maintenance required. For this maintenance government cannot having suitable funds. That's reason this all maintenance cost bear by the local government bodies like gram panchayat. But those bodies cannot have suitable income for implement of scheme in future, so such schemes are discontinued and peoples drink the contaminated water.Like above problem Koparde Haveli village can suffers same things. The village has a water treatment plant but this plant can't work properly. The village is just located 10 km from town center of Karad. Therefore, so many people stay in the village and population of village is gradually increased. But the drinking water facilities can't develop as per increasing population. There have a so many farmers and other peoples staying in village but there has a problem of availability of pure drinking water. Along our filter we can efforts for eliminate that problem in budget friendly nature.

b) Survey: As Per Visited Koparde Haveli Village Following Data Collected. On the 12th of December 2022, at 02:19 PM, a significant field visit was conducted in the village of Koparde Haveli, nestled in the heart of the Indian state of Maharashtra. This village is situated within the Satara district, specifically in the Taluka of Karad, approximately 10 kilometers from its more prominent neighbor, Karad. The geographic coordinates place Koparde Haveli at a latitude of 17.33ºN and a longitude of

74.18ºE making it a pivotal point for this study.The primary focus of this visit was to examine the village's water source, which predominantly relies on the Krishna river. This surface source originates from the picturesque hills of Mahabaleshwar, also within Maharashtra, before meandering its way through the Satara district and eventually reaching Koparde Haveli. As of the 2011 census, the village was home to a population of around 6,000 individuals, signifying the crucial role played by the Krishna river in sustaining the livelihoods and daily activities of its residents.

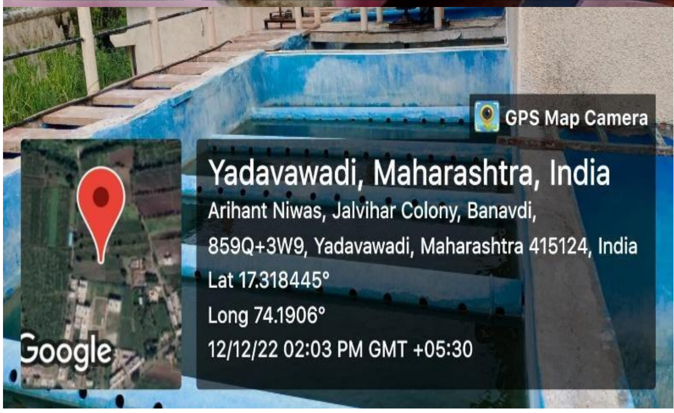
c) Visit to Water Treatment Plant Koparde Haveli:

1. Aeration : This aeration helps to remove gas and odour and mix oxygen in waterThis on-site exploration serves as a valuable starting point for a more comprehensive study on water resource management, quality, and sustainability within this region. It lays the foundation for future research endeavors aimed at safeguarding the invaluable water resources that flow through the heart of Maharashtra and nurturing the well-being of the people of Koparde Haveli and beyond. Other components in water supply system as follows.

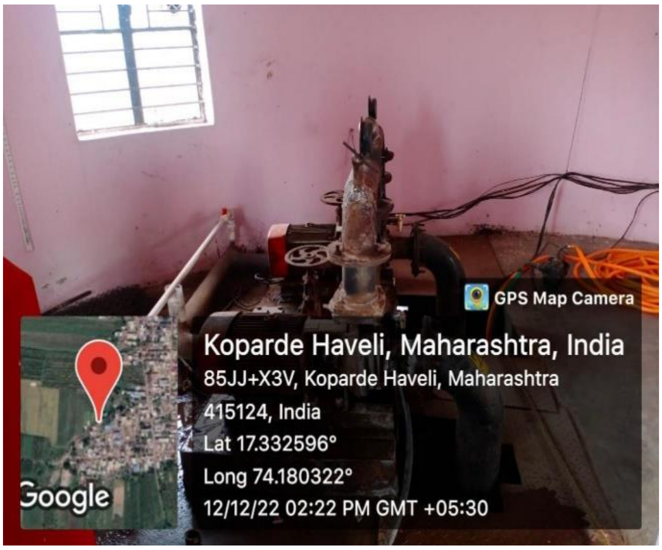
2. Flocculator : In this stage some disinfectant and PAC powder mix in water.

3. Filtration Media: In this stage water comes in the filtration beds through tube settler. In this stage water can passes by filter bed consist of sand gravels of various sizes

4.Disinfection Stage: In this stage TCL powder and chlorine is add for disinfection of water.



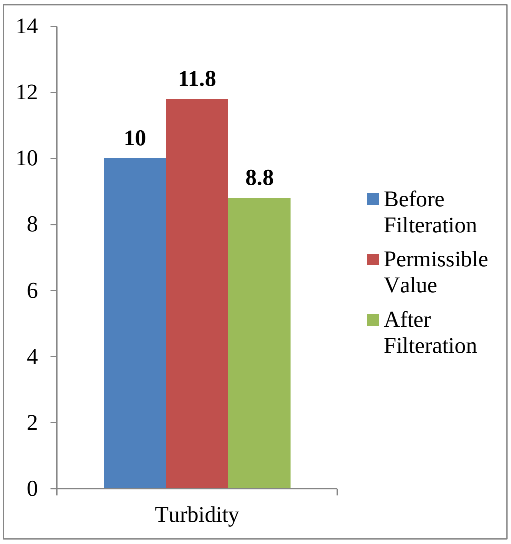
5.Storage Tank: After disinfection of water pure water collects at underground storage tank.



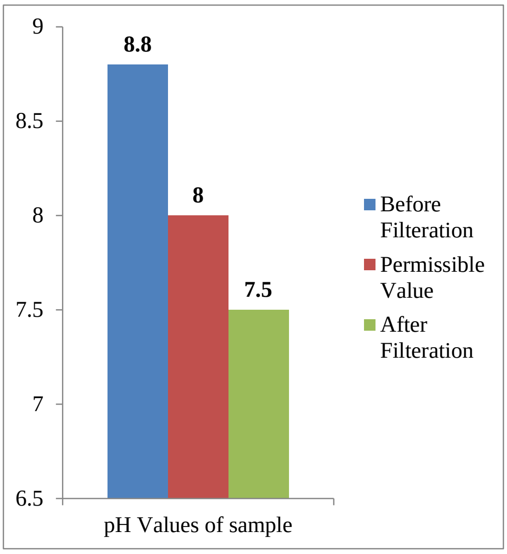
V RESULT AND DISCUSSION

Table 4.1 Analysis of parameter

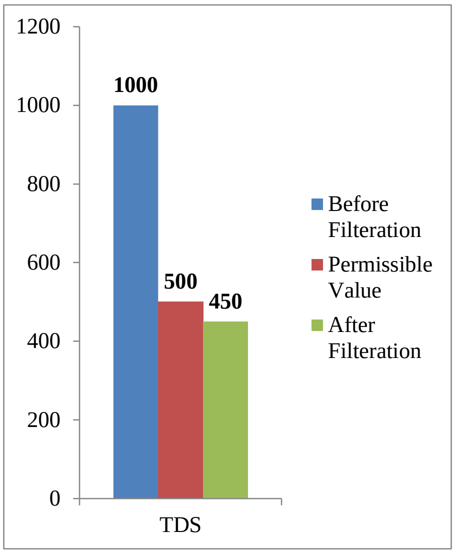
Parameter	Acceptable Values	Result before filtration of Sample	Result after filtration of Sample
Colour	Clear	-	Clear
Temperature	Room Temp.	Room Temp	Room Temp
Turbidity	5 to 10 NTU	11.8 NTU	8.8 NTU
Tests & Odour	Unobjectable	Objectable	Objectable
pH	6.5 to 8.5	8.8	7.5
TDS	500 mg / L	1000 mg / L	450 mg / L
Hardness	300 mg / L	396 mg / L	269mg / L
Chlorides	250 mg / L	305 mg / L	235 mg / L
Bacterial test	Maximum 6	8	7



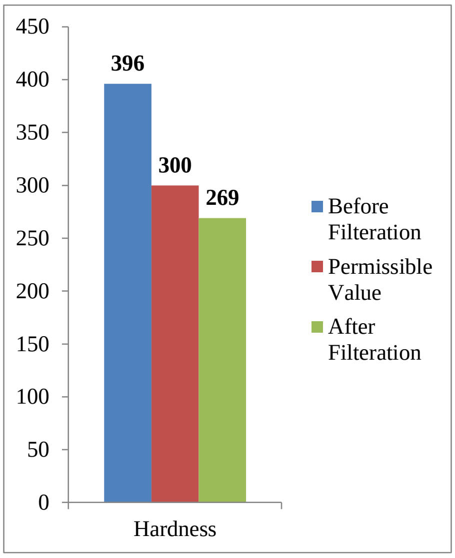
Graph 4.1: Turbidity of sample



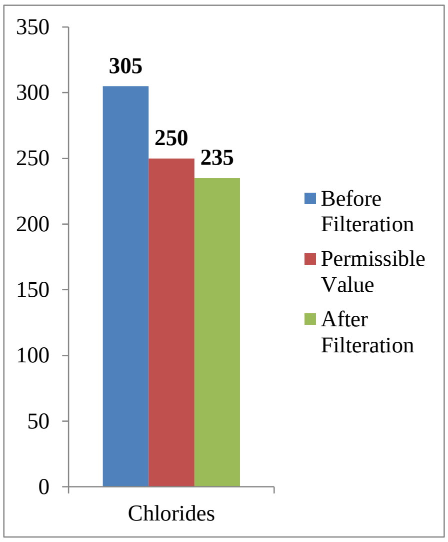
Graph 4.2: pH value of sample



Graph 4.3: TDS value of sample



Graph 4.4: Hardness



Graph 4.5: Chlorides value of sample

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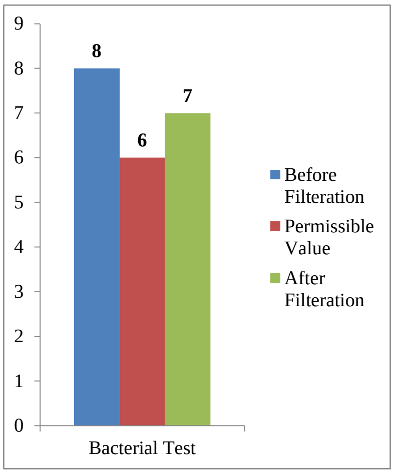

Graph 4.6: Bacterial test value of sample

VI CONCLUSIONS

- The colour of this sample before filtration is Un-clear but after filtration the colour of the sample is clear.
- The turbidity of the sample before filtration is 11.8 NTU but after filtration this is 8.8NTU. The acceptable value is 5 to10 NTU so our value after filtration is acceptable.
- The pH of the sample before filtration is 8.8 but after filtration is 7.5 the acceptable value of pH is 6.52 to 8.5. Hence our after filtration value is acceptable.
- The before filtration TDS value is 1000 mg per litter and after filtration value is 450 mg per litter which is less than the acceptable TDS value which is nearby 500 mg per litter so our value of TDS is acceptable.
- The hardness of the sample before filtration is 396 mg per litter but the hardness of the sample after filtration is 269 mg per liter and acceptable value of hardness is near by 300 mg per litter so hardness value is acceptable.
- The chloride value in the sample before filtration is 305 mg per litter and after filtration required value is 235 mg per litter and acceptable chloride value is nearby 250 mg per litter so our chloride value is acceptable.
- Along that all conclusions we can get the final result is that the village of Koparde Haveli water sample collected and this water sample tested in the lab before filtration and after filtration and comparison between their parameters and hence conclude that after filtration the collected sample water is purified and drinking for the drinking purpose.
- Also, we can conclude according to our questioner survey some peoples are spending Rs 1800 to 2000 for getting purified drinking water but our filter costing is nearby 1500 to 1800 rupees hence providing affordable filter to the rural people.

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