

# Purification of Water by Rice Husk Ash Filter Bed

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**Abstract:** India is an under developing country with vast people population which leads to pollution by directly or indirectly human mistakes. Due to its potency India has scarcity in fresh water, and different measures need to be adopted to get fresh water. Filtration is most commonly adopted to purify water in all over the parts of world. Yet there are many villages in India which cannot adopt the filtration process. In this experimental work, a filter is prepared with rice husk ash and study in purification of water is done. Various physical properties of purified water and tap water are compared.

Index Terms – Water filter bed, Rice husk ash in purification of water, Natural filter

## 1.0. INTRODUCTION

Overwhelming metals in water are begun from squander water of numerous ventures. These substantial metals effectsly affect condition and human wellbeing. A little presentation to these substantial metals even at low fixation can cause numerous genuine sicknesses. Along these lines, the expulsion of substantial metals from water is to be thought about genuinely. Numerous systems are embraced for purification of overwhelming metals from water. These strategies incorporate synthetic precipitation, adsorption by actuated carbon, part partition techniques, coagulation

## 1.1. HISTORY OF WATER FILTERS:

The historical backdrop of water channels can be followed to the soonest civilizations with composed records. Water channels have been utilized all through history to enhance the wellbeing and style of water proposed to be utilized for drinking or washing. In current circumstances, they are likewise broadly utilized as a part of industry and business. The historical backdrop of water filtration is firmly connected with the more extensive history of enhancements in general wellbeing.

By preparing filter beds with layers of fine aggregates, coarse aggregates, herbs powder, sponge, and whatman filter paper. After filtration of water the following tests are to done:

- |              |                     |                    |
|--------------|---------------------|--------------------|
| 1. Turbidity | 4. Phosphates       | 7. Mineral acidity |
| 2. Chlorides | 5. Iron             | 8. Total acidity   |
| 3. Nitrates  | 6. Dissolved oxygen |                    |

## 1.2. OBJECTIVE

- To decide the compound sythesis of rice husks.
- To set up enhanced conditions and possibility of rice husks for evacuating Cu, Zn and Pb particles from artificially arranged filter.
- To foresee expulsion productivity of rice husk

## 2.0. METHODOLOGY

### 2.1. FILTRATION MODEL DEVELOPMENT AND MATERIALS USED

#### 2.1.1. FILTRATION MODEL DEVELOPMENT:

Here we have manufactured a simple cylindrical filtration bottle as shown in Figure 3.1.1 with the Following dimension:

- Length=15cm.
- Internal diameter = 7.3 cm.
- Base and top is covered with a sponge of 2 cm thickness as per Fig 3.1.2.
- From the base, outlet pipe is extended to collect water with a tap as shown in fig 3.1.1 to regulate filtered water.
- Top of the cylinder filter bottle was covered with a cap of 0.5mm thickness as shown in figure 3.1.1.

A hole of 12mm diameter was made to connect with the inlet pipe.



Fig.1 : Rice Husk Ash filter bed model

#### 2.2. MATERIALS USED AND PREPARATION OF ADSORPTION MEDIA:

Large number of scientist and environmentalist has investigated the possibility and efficiency of utilization of the herbal as an adsorbent for heavy metal adsorption in polluted water. Following materials were used in removal of iron from water, discussed below.

### 2.2.1. PLANE SAND

Fine sand and gravel are naturally occurring glacial deposits high in silica content and low in soluble calcium, magnesium and iron compounds are very useful in sedimentation removal. But here the media is used for iron removal from drinking water. Here for the experimentation plane sand passing through 475Micron retained sand as top layer, 236microns passed sand and 235microns retained sand as middle layer and 75microns sand retained as bottom layer IS sieve



Fig. 2 :sand

### 2.2.2. RICE HUSK ASH:

In India, 80% of general medical issues originate from water-borne or water-related ailments. There is a solid requirement for minimal effort, indigenous advances to help in the arrangement of consumable water to the country and urban poor.

Indian scientists have built up a family-estimate channel, utilizing rice husk slag, that is straightforward, modest, and simple to work at the town level.

Rice husk powder (RHA) is a horticultural waste item that is plenteous all finished India, and expenses nothing. It can be fortified with concrete, formed and molded into any shape, and does not require firing. The scientists thought about three channel models (utilizing RHA reinforced with prefired earth, RHA fortified with portland concrete, and RHA fortified with bond in a rock lattice). The execution of each of the three was worthy, as they could expel about all suspended issue in the water and in addition 99% of the microorganisms. In any case, the channel plan with the stone network gave the best outcomes.

The rock framework channel utilizing RHA fortified with concrete is another idea. A tube shaped compartment is loaded with stones, and the RHA blended with 7.5% common portland bond is then filled it. The utilization of fine RHA (212 micron, yet no better) expands the proficiency of the channel.

The stones, ideally little, bolster the channel material and give the accompanying points of interest. Filtration is enhanced as the water needs to take after a convoluted course;The stones avert splitting and contracting of the RHA-concrete filling when it dries.



Fig. 3: Rice husk Ash

### 2.3. PROCEDURE FOR PREPARATION OF STANDARD SOLUTION:

- Standard solution of the toxic element will be prepared by mixing toxic element with the water.
- Filter model will prepared consisting sponge, sand and different herbs.
- Then standard solution will pass through the filter model and final solution obtained is the purified solution.
- Finally the water properties will be calculated.

### 2.4. RICE HUSK ASH FILTER



Fig. 4: Filtering with Rice Husk Ash bed

Rice husk ash water filter experimentation plane sand passing through 475Micron retained sand as top layer, 236microns passed sand and235microns retained sand as middle layer and 75microns sand retained as bottom layer IS sieve .Top and bottom layer of sand having different thickness and in between a layer of rice huskash of different amount was placed .The sand and rice husk ash filters the water and collected in a beaker then it is filtered through a Whatman filter paper. And tests are conducted on filtered water to know whether there is a change in water properties . And tests are conducted on filtered water to know whether there is a change in water properties . and differnts like mineral acidity, toatla alkanity,chloride content, nitrates content, phosphates content, dissolved oxygen are conducted and the test results are as follows:

## 2.5. TESTS CONDUCTED

Tests are conducted after the filtration to know the change of the properties before and after the filtration of water. The tests are conducted are as follows and procedure for the tests are given below.

1. Nitrates
2. Chlorides
3. Phosphates
4. Mineral acidity
5. Total acidity
6. Iron
7. Dissolved oxygen

## 3.0. RESULTS

The results are obtained the change the properties by using rice husk as mentioned in 2.4. The rate of filtration and the



effectiveness in change of water properties are tabled here. The results are shown in Table 1.

After filtration of water the tests are conducted and there results are compared with the tests results of water before filtration. By comparing tests we can know that water that what are properties changing in the water by using tulsi powder as filtration of water. And how it is used for the filtration of water.

Table 1: Details of Rice husk ash filter

| Sample no: | Thickness of Sand layer (cm)              | Amount of Rice husk ash |
|------------|---|-------------------------|
| 1.         | Top layer=2cm<br>Bottom=3cm<br>Sponge=2cm | 6grams                  |

Table 2: Comparison tests before and after filtration with rice husk ash:

| TESTS CONDUCTED  | BEFORE FILTRATION | AFTER FILTRATION |
|------------------|-------------------|------------------|
| Nitrates         | 10ppm             | 5ppm             |
| Chlorides        | 80ppm             | 100ppm           |
| Phosphates       | 5ppm              | Nil              |
| mineral acidity  | Nil               | Nil              |
| Total acidity    | Nil               | 250ppm           |
| Iron             | 1.4ppm            | 1.4ppm           |
| dissolved oxygen | 60ppm             | 50ppm            |

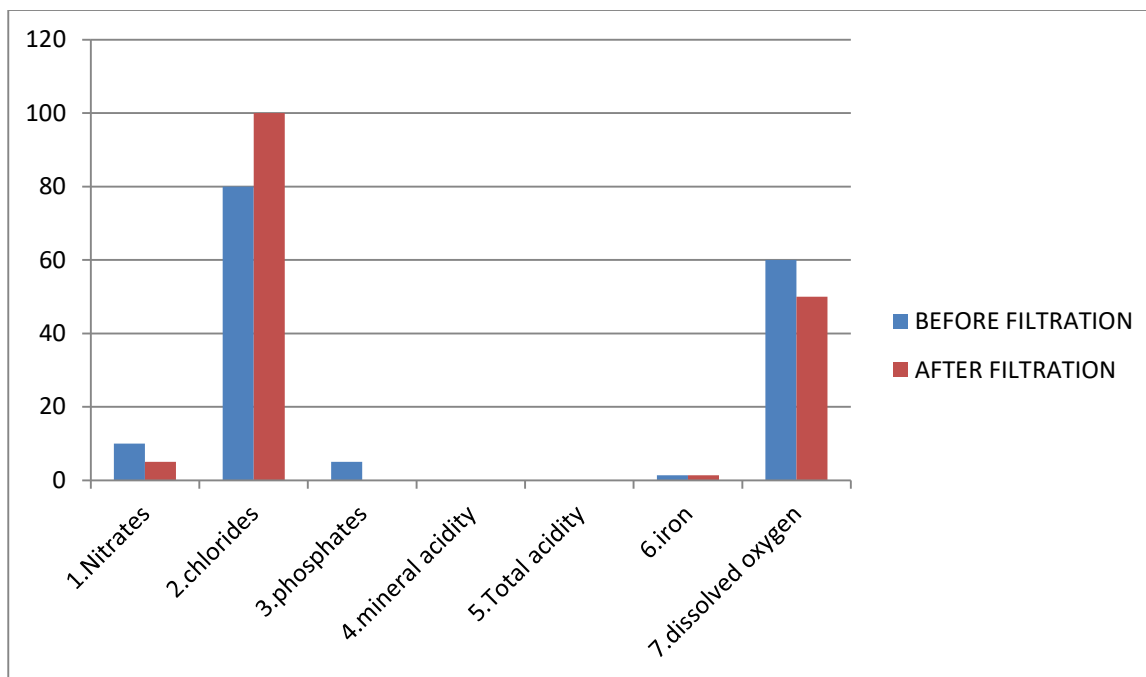


Fig.5: Before and after filtration with rice husk ash

#### 4.0. CONCLUSIONS

1. From the above results it is concluded that using rice husk ash in filter reduces nitrogen phosphates and dissolved oxygen. It is also seen that there is no change in iron and mineral acidity
2. It is also observed that using rice husk ash as filter bed increases chlorides and total acidity

#### 5.0. REFERENCES

1. Lalit M, et al. (2011): Ocimum Sanctum Linn (TULSI) -an overview, International Journal of Pharmaceutical Sciences Review and Research,7,52-53.
2. George A.and Chaudhuri M. (1977):Removal of iron from ground water by filtration through coal, J.Am Water Works Assoc. 69,385-389
3. Iqbal M. and Edyvean R. (2004):Biosorption of lead, copper and zinc ions on loofa sponge immobilized biomass of Phanerochaete chrysosporium, Minerals Engineering, 17,217 -223.