

**A REVIEW FOR : DESIGN OF DUAL MEDIA WATER FILTER PURIFIER USING
CLAY POT**

¹Thakare Abhijit M, ²Kuwar Hemant A
PG Scholar, Assistant Professor

ABSTRACT

Low cost water treatment devices for rural households like filters, RO and UV based water purifiers are developed by many industries but these devices suffer from problems like filter clogging, periodic replacement of filters, wastage of water (in case of RO) and unavailability of electricity in rural areas making them costlier. Due to above reason RO, UV purifier are not affordable to rural areas. The objective of my project is to deal with improvisation in existing filter design and remove the flaws in existing filtration models at economical level. The study deals with the purification of water using naturally available material using copper mesh as a disinfectant, coconut shells as filter media and provide effective and economical water purifier for rural area. Earthen pots will be used for the purification of water made from different proportions of Clay and Saw dust (50:50, 60:40, 70:30). Lake and well water will be treated as it is normally used in rural areas. Various drinking water test will be carried on samples before and after the treatment of water. As per the study of various research papers showed that the filters were capable to treat water as per the drinking water standards. Maximum turbidity and TDS removed. As copper is used as a disinfectant in this case, less chances to trace of E-coli found in the treated water. After completion of over all experiment clay purifier can be effectively used as a low cost filtration device in rural areas.

Keywords: Pot filter, Economical, Effective, Reverse Osmosis, Ultraviolet, Rural areas .

1. INTRODUCTION OF THE PROJECT WORK

One of the important problems, currently facing the society, is the provision of clean drinking water. According to the forecasts, the situation will worsen in the future due to the reduction of fresh water supplies and population. Today, progress in environmental sciences has developed various techniques for purification of water. Special 'water treatment plant' is designed in water supply scheme for this purpose. It involves different steps of operation making water usable and even potable. Treatment units include coagulation, flocculation, sedimentation and filtration units basically. Our project entitled "Modification in RSF with coconut shells as capping layer" deals with the recent improvisation in filter design removing the flaws in existing filtration models.

1.1 Problem Statement

The filtration units in treatment plants are observed to be less efficient and facing major problems in its operation such as high head loss, frequent clogging, reduced filtration rate, more wastage of filtered water in backwashing as higher backwashing requirements, reduced filter run and thus ultimately affecting on quality of filtration.

1.2 Objectives

Our objective is to develop a working model as an alternative for RO and UV purifier in rural areas at low cost, which will provide safe drinking water as per the standards prescribed and it can remove disadvantages of RO and UV in more efficient and economical way.

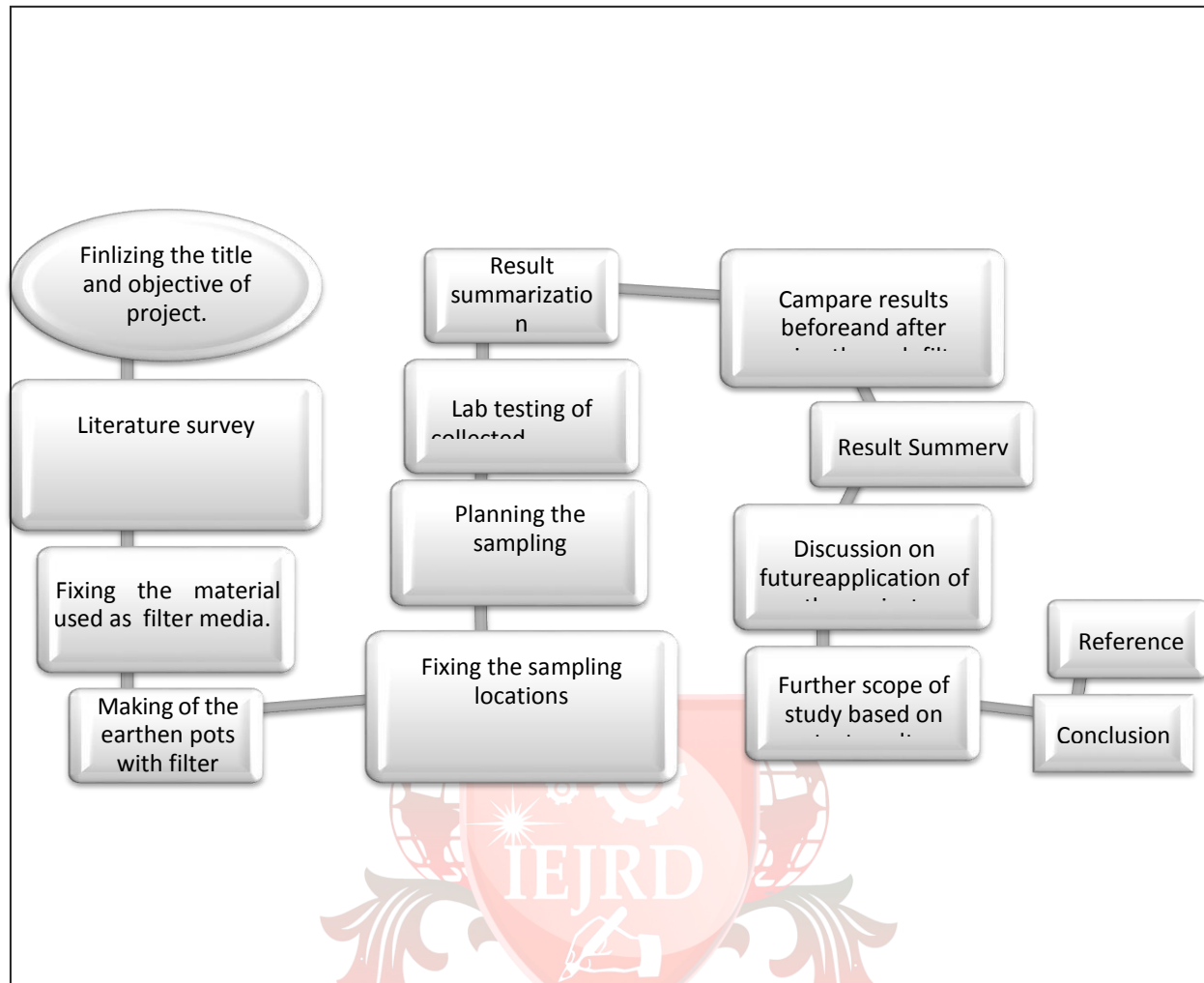
2. METHODOLOGY**2.1 Study Area**

The district of Dhule, formerly known as West Khandesh and categorized as district head quarters since 1960. Situated between 20°38' and 22°3' North latitude and 73°47' and 75°11' East of longitude, is the westernmost of the districts of Northern border area of Maharashtra State.

2.2 Material Used

Clay, Sawdust, Copper mesh as Disinfectant, Fine Sand & Gravel, Coconut Shell, Activated Carbon, Cotton, Corn Starch and Maize waste.

2.3 Flow Chart



2.4 Casting Procedure of Filter :

- Clay and sawdust will be taken in required proportions for casting of filter -
 - Model I 50:50
 - Model II 60:40
 - Model III 70:30
- During this the mixture should be carefully searched for hard particles like small Stones etc.
- A fine mixture is prepared so that earthen vessels can be moulded out of it.
- After preparing the mixture, three pots (matkas) shaped like a hollow spindle are moulded of similar dimension- diameter 10 inches, height 1 foot and wall thickness 0.59 inch.
- It will be kept in kiln and burning.

2.5 Information about Model

Total number of models used for this project 3 Nos. The models each for same material. Name of models A, B, and C For making of each pair different quantity is used. Material used for each two model is different as following:-

- Model A – 50% Clay & 50% saw dust
- Model B – 40% Clay & 60% saw dust
- Model C – 30% Clay & 70% saw dust.

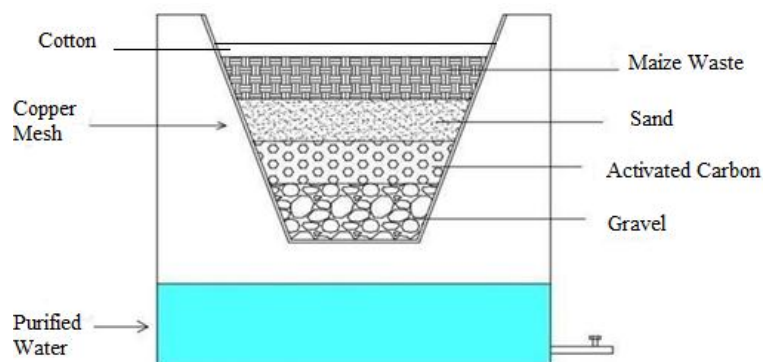


Figure 2.1 Schematic Diagram of a clay pot water filter

3. ANALYSIS

3.1 *Physical Parameters*

Turbidity, Temperature

3.2 *Chemical Parameters*

pH, Chlorided, Flourides, Total Hardness, Total Dissolved Solids, Total Suspended Solids, Conductivity, Copper Content

EXPECTED OUTCOMES

- Filtration efficiency will better as compare to other water purifieres.
- Dual water filter will maintained water treatment efficiency for various parameters.
- Dual filter will reduce backwashing requirement.
- It will less costly as per estimated cost.
- Due to very less cost it will provide economical method for water purification.
- Dual filter will remove organic compounds causing tastes and odour, by passing the water through activated carbon & other naturally available material.
- It will remove unwanted minerals from water.
- The final filtered water will be good for consumption, as it will contains all necessary minerals required by the body.
- It will kills disease causing bacteria present in the water.
- The water pass through the filter will be healthy for consumption.
- Clay pot filter will better alternative for the people in technology deprived areas of India.

REFERENCES

- [1] Adeyemi Samson Adeleke et al (2018) A Study of Ceramic Pot Filters Made From Clay Body and Sawdust Journal of Resources Development and Management ISSN 2422-8397 An International Peer-reviewed Journal Vol.45, 2018.
- [2] Ajay J Varkey* and MD Dlamini Point-of-use water purification using clay pot water filters and copper mesh Department of Physics, University of Swaziland, Private Bag 4, Kwaluseni M201, Swaziland.
- [3] Lopa Sarkar¹, S.K.Biswal², R.K.Panigrahi³ Assessment of Efficiency of a Simplified Cost-Effective Modified Bio sand Filter for the Removal of Iron, Turbidity and Coliform Bacteria from Ground WATER Full Paper Proceeding TMBER-2015, Vol. 2, 376-389.
- [4] Majid. Muhi Shukur Mohsin Abbas Aswad Effects of Sawdust and Rice husk Additives on Physical Properties of Ceramic Filter Journal of University of Babylon, Engineering Sciences, Vol.(26), No.(1): 2018.
- [5] Nayan Kishore Giri Design of cost efficient filtration cartridge using iron impregnated activated carbon for the removal of arsenic and iron.
- [6] Mohamed Ahmednaa, Wayne E. Marshall The use of nutshell carbons indrinking water filters for removal of trace metals Water Research 38 (2004) 1062–1068.