

# EXPERIMENTAL WORK BY VACUUM METHODOLOGY STUDY ON WASTE WATER

N. RAVICHANDRAN<sup>1</sup>, K. SARAVANAN<sup>2</sup>, C. SANJITHKUMAR<sup>3</sup>, A. RAGHUL<sup>4</sup>, Mr. S. MANIKANDAN<sup>5</sup>

<sup>1,2,3,4</sup>UG Students, Department of Civil Engineering, Panimalar Engineering College

<sup>5</sup>Assistant Professor, Department of Civil Engineering, Panimalar Engineering College

\*\*\*

**Abstract** - Effective wastewater collection and treatment are of great importance from the both of environmental and public health. Poor sanitation and waste disposal methods are the main reason for affecting drinking water contamination also it causes health risks and environmental pollution. The main aim of the project to collecting the waste water in residential and this water converted into pure water by filtration technique. We are using RO filter by removing the contaminants of waste water. In our project we are using RO filter for purifying purpose. This mechanism absorbs 3-5 litre of water per hour.

**Key Words:** electrocatalysis, nanoporous membranes, nano particles

## 1. INTRODUCTION

Water is the source of life, and one of the most important material resources for human survival and development. Although 71% of the earth's surface is covered with water, freshwater resources that can be directly used by humans, such as river water, freshwater lakes and shallow groundwater, account for only 0.03% of the total water amount. Moreover, with the rapid development of industries and increasing human activities, such as metal plating, fertilizers, tanneries, mining, paper, batteries, pesticides, and etc., many harmful inorganic and organic pollutants are released into water, which seriously endangers the freshwater resource and ecological environment. Heavy metallic ions in water are difficult to biodegrade, and they can enter the human body through the food chain, causing a series of irreversible physiological diseases. For example, mercury ions can damage the central nervous system, leading to headaches, stomatitis, and gastroenteritis. Lead ions can cause an inadequate supply of nutrients and oxygen, resulting in brain tissue damage. Especially for children in their growth and development stages, excessive lead ions in their bodies would lead to developmental delay, loss of appetite, and hearing impairment. The drinking water contaminants are seldom high enough to cause immediate health effects. Drinking water contaminants are more likely to cause chronic health effects. Usually, chronic health effects happen when a human is repeated expose to small amounts of chemical in the drinking water. Examples of chronic health effects are cancer, liver and kidney damage. Drinking water contaminants which may lead to health effects divided into five groups including microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, and organic

chemicals. Activated carbon has been used as water filtering medium for purification of drinking water for many years. The systems are made specifically to ensure that all water using systems at home and do not get harmed due to clogging and sedimentation. It uses superior grooved depth diltration technology to have a longer life and better performance. Reverse osmosis (RO) is a water purification technology that uses a partially permeable membrane to remove ions, molecules and larger particles from drinking water. In reverse osmosis, an applied pressure is used to overcome osmotic pressure, a colligative property, that is driven by chemical potential differences of the solvent, a thermodynamic parameter. Reverse osmosis can remove many types of dissolved and suspended chemical species as well as biological ones (principally bacteria) from water, and is used in both industrial processes and the production of potable water. The result is that the solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side. To be "selective", this membrane should not allow large molecules or ions through the pores (holes), but should allow smaller components of the solution.

## OBJECTIVE OF THE PROJECT

To calculate the quantity of waste water which affects the environment. To design the waste water treatment plant for apartment based on quantity of waste water.

### 1.1 SCOPE OF THE PROJECT

To select the appropriate treatment method for treat the waste water. To reuses the treated waste water for gardening and solid waste for manure of plants.

## 2. LITERATURE REVIEW

This paper presents fabrication and experimentally investigates the working of Pedal Powered Water Pump filtration (WFV) along with its purification which had used for pure drinking water supply and garden irrigation. WFV will consist of a centrifugal pump operated by pedal power. Water is the most basic necessity for life yet nearly one billion people in the world lack to access it. Given that our design must target a demographic that includes some of the poorest regions in the world, reliability is one of the primary factors incorporated into the design. The functionality of the pump and filter system needs to require as little

maintenance as possible. The design must also be user-friendly as the assumption will be made that users will have no experience with any vehicle of this type. Once the design is optimized, materials within the build will be considered to find the most cost-effective method of manufacturing. The results indicate that the WFV will give a considerable amount of discharge and head.

### DESIGN AND FABRICATION OF WATER FILTRATION VEHICLE:

**Abhay Tandekar, Satish Sharnagat, Krishnakumar (2017)**

### 3. VACUUM METHOD

In vacuum filtration, a vacuum pump is used to rapidly draw the fluid through a filter. Hirsch funnels and Buchner funnels, which are the same kind of funnel in two different sizes, are used along with filter paper. The funnels have a plate with holes in it, as we can see below, and they are usually used when the substance to be filtered is small in volume. Filtration has many different uses, such as the cleaning of water, like river water, from impurities. It can also be used for sterilization without the use of heat, as long as the filter's pores are small enough to catch the microorganisms. Keep in mind that this process will not kill the microorganisms since it does not make use of heat.

### 4. FILTRATION

Activated carbon filter technology removes these gases and smoke particles present in water. The filter works on the principle of adsorption in which activated carbon bonds with gas elements. After the bonding, polluted water gets filtered and all you receive is the pure water. Let the polluted water inside the filter exchange with the outside pure water. It depends upon the water conditions. Try to eliminate the source of water pollution from the polluted area. Usually, bacteria, dust, mold, chemical particles, and pollen pollute the apart from these, industrial places gets heavily polluted water.

### 5. TRIAL TEST RESULT

NO OF TEST	TIME CONSUMPTION	QUANTY OF WATER
Test 1	1 hr	3 lit
Test 2	2 hr	5lit
Test 3	3 hr	Above 8 lit

### 5.1 STATIC ANALYSIS:

Normal filter range – 2 lit per hour

Ro filter range – 3-5 lit per hour

The 24 volt pump increases the efficiency of filtration process.

### 6. CONCLUSION

In this we conclude that vacuum methodology and mat is used to collect storm water and filter it for reuse so as to provide a low cost filtration unit. This includes various fabrication strategies of RO filter membranes and their applications in the field of water purification. We have found that the solute and water permeability play important roles in the membrane performance. The filter separate pollutants (such as inorganic ions, organic molecules, nano particles, etc.) from water mainly through size exclusion and solution diffusion. Although these reported membranes are demonstrated successfully at the laboratory scale, up scaling them to low-cost, industrial-scale modules is still a big challenge. To filter the large quantity of waste water converted into pure water. To overcome the water consumption problem and treated water using various applications.

### 7. REFERENCES

- [1] R.J. Bull and F.C. Kopfler (1991). Health Effects of Disinfectants and Disinfection by-Products. AWWA Research Foundation. Denver. CO.
- [2] Muhammad B. Mat Junor @ Yunus (2008). Development of Activated Carbon for Textile Wastewater Bioremediation System. Universiti Teknologi Malaysia: Thesis Master
- [3] Department Of Environment Malaysia. River Water Pollution Sources.
- [4] Frank R. Spellman & Joanne Drinan (1999). The Drinking Water Handbook. Technomic Publishing Co, Inc. United States of America. pp 151-152
- [5] P. Payment, M. Waite and A. Dufour (1997). Introducing Parameter for the Assessment of Drinking Water Quality. World Health Organization (WHO).