

Frustum Shaped Gravity Assisted Water Purifier with Spiral Tube Filter

Ankush Das¹ Alok Saha² Shripati Bhise³ Sahil Joshi⁴

^{1,2,3,4}BE Student

^{1,2,3,4}Department of Mechanical Engineering

^{1,2,3,4}Bharati Vidyapeeth's College of Engineering Lavale, Pune, India

Abstract— Water is an important source for sustenance of life on earth, since the sources of fresh water are limited, effective utilization of the same is the prime need. Rapid urbanization and growth of population led to the bang on water bodies. Drinking of the pollute water leads to many health problems, and thus increases the expenditure on health. A straightforward, easy cost effective “frustum shaped gravity assisted water purifier with spiral tube filter” utilizes the gravity as the concept, increased surface area and increased path of contact. no electricity is needed for the product, the product is suitable for both city as well as village areas. The designed water purifier consists of the following parts, Spiral Tube filter, frustum shaped filter, cylindrical shaped container and a supporting frame.

Keywords: Purifier, Frustum Shaped

I. INTRODUCTION

Water purification is the process to withdraw unacceptable chemicals, biological pollutants, particulate solids and gases from water. The aim is to produce water suitable for a distinct desire. Most of the water is clean for human utilization (drinking water), but water purification may also be adapt for a several of other reasons, including fulfilling the personal essentials of medical, pharmacological, chemical and industrial applications. The methods used include physical processes such as filtration, sedimentation, and distillation; biological processes such as slow sand filters or biologically active carbon; chemical processes such as flocculation and chlorination.

After purifying the level of undesirable things such as debris, bacteria, fungus and other foreign particulate may be reduce up to great extent.

Government has standardize the quality of drinking water and on that basis the drinking water should be used for the consumption. This all includes the concentration of contaminants, maximum and minimum it is decided by the government or by international standards depending on for what purpose the water is to be used.

Visual inspection can only detect the particles that can be seen by the naked eyes but other than that various contaminants includes bacteria, micro-organisms this all cannot be detected by the human eyes only the house hold ways of water purification is not sufficient to clean the water such as boiling water or water purification by carbon. In this filter there are three layers of filtration from which the water will pass through it and will get filtered slowly.

II. METHOD & MATERIAL

A. Material

There are three layers for filtration all the three layers are assembled inside the frustum shaped container and they are 1. Activated charcoal 2.moringa oleifera seeds 3.gravels or river sand.

Activated charcoal is the charcoal that is treated with oxygen to make it porous to make it of adsorption characteristics. The surface area of activated charcoal is about 2000 per gram .the adsorption characteristics stuck the foreign particulate thus purifies the water. conventional apparatus for purifying water is an activated charcoal filter are commonly used to remove the odor and chemicals, such as chlorine from potable drinking water and may comprise cloth mesh portions and activated carbon portions solid pollutants are removed.

The use of moringa oleifera in traditional medicine for improving sleep and control sugar level other than that it is extensively used in treatment of digestion, skin disease, diarrhea and hysteria. Experimentally it is shown that it has anti-inflammatory action. Moringa seed has the property of active coagulation and are used for clearing the haziness of water in many countries. The medicinal and therapeutic properties of this plant have led to its application as the cure for different ailments and diseases, physiological disorders, and in eastern allopathic medicine (akthar et al. 2007).

River sand or gravels is the bottom most layer it clears the haziness and some foreign particulates from the water.

B. Method

Activated charcoal were used in ground form the activated charcoal was put in to the spiral tube from where the input of water comes. The preparation for the moringa oliefera is of little bit long process since it has to be dried first then only it can be useful for the purification of water First we Allow the moringa seeds pods to dry naturally before harvesting them. Then Removed the seed husks, leaving a whitish kernel .and crushed it in the form of powder with the help of stone and lastly the clean river sand and gravel were bought this all three filtration elements were layered one above the another the bottom most layer was kept of gravel then the moringa oleifera and the top most the activated charcoal layer. Between these all layers there is a fine mesh of wire for the each filtration layer to be separate from each other but at the same time should pass the water through all those three layers.

III. COMPONENTS

It consists of mainly four components, frustum shaped cone for accommodating all the filtration layers, cylindrical structure for the storage of filtered water, the spiral tube for increasing the length of path of contact for the filtration and the supporting stand. The spiral tube is connected to the overhead tank from where the supply for the water is given, the spiral tube goes up to the bottom most layer of the filter the number of turns on the spiral tube depends on how much the efficiency is needed. Now the water once passed through the spiral tube now it has to passed through all the three layers which are in the frustum shaped structure all the three layers

will filter the water and will store the water in the cylindrical container now the water can be used for the drinking purpose through tank.

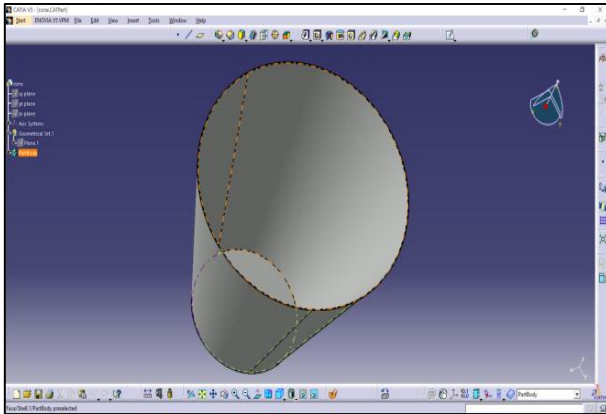


Fig. 1: frustum

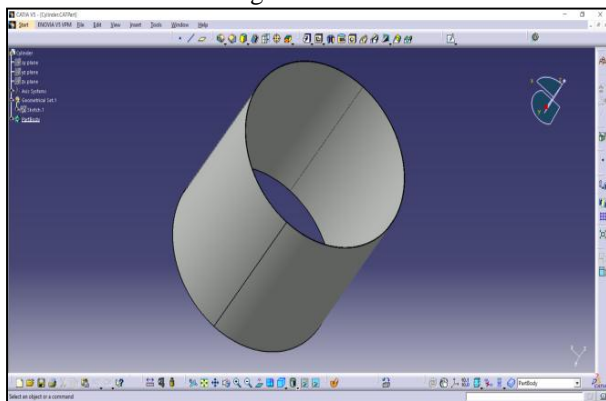


Fig. 2: cylindrical container

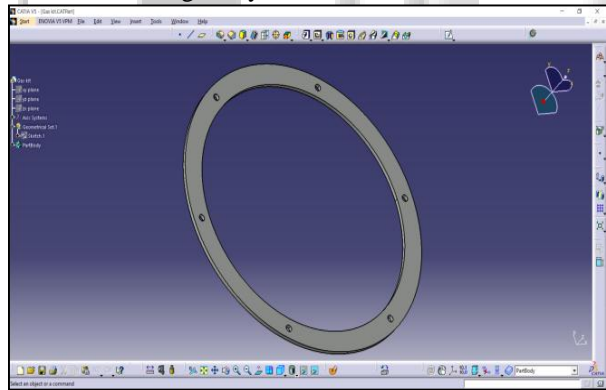


Fig. 3: Gasket

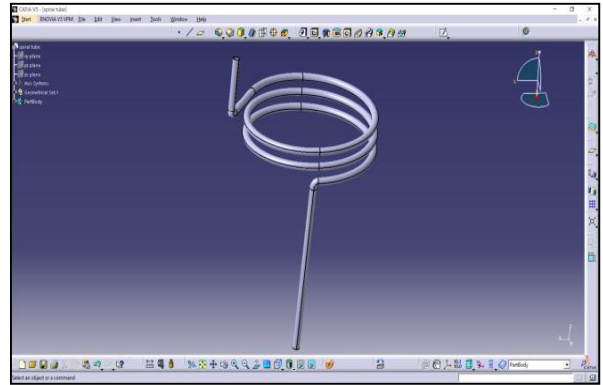


Fig. 4: Spiral tube

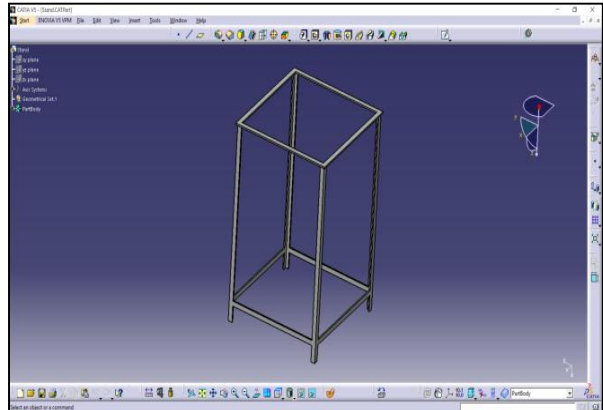


Fig. 5: Stand

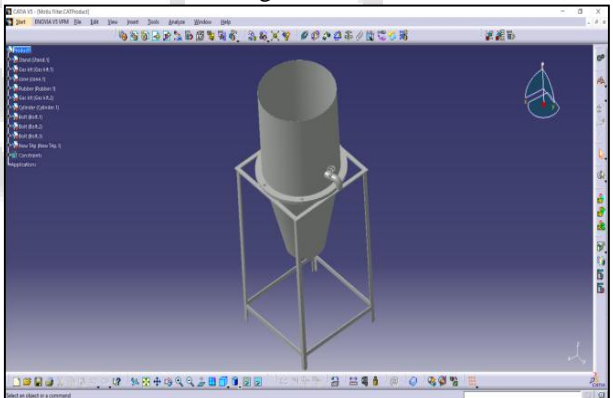


Fig. 6: Frustum shaped gravity assisted water purifier with spiral tube filter

IV. RESULT AND DISCUSSION

SR.NO	PARAMETERS	BEFORE FILTERATION	AFTER FILTERATION	IS 10500:2012 LIMITS	METHOD OF ANALYSIS
1.	pH	3.32	7.45	6.5-8.5	IS 3025(part11):1983
2.	Color(hazel units)	NIL	NIL	5(max)	
3.	Turbidity(NTU)	NIL	NIL	1(max)	IS3025(part 10)1984
4.	Total alkalinity as CaCO ₃ (mg/L)	NIL	30.00	200(max)	IS3025(part23)1983
5.	Total hardness as CaCO ₃ (mg/L)	1970	135.00	200(max)	IS3025(part21)1983
6.	Chlorides as Cl (mg/L)	141.80	28.36	250(max)	IS3025(part32)1998
7.	Total dissolved solids(mg/L)	2150	200.00	500(max)	IS3025(part16)1984
8.	Iron as Fe(mg/L)	0.20	NIL	0.3(max)	IS3025(part 53) :2003

9.	Sulphates as SO ₄ (mg/L)	31.30	1.06	200(max)	IS3025(part 24) :1986
10.	Nitrates as NO ₃ (mg/L)	2.78	NIL	45(max)	IS3025(part 34) :1988
11.	Fluoride as F(mg/L)	NIL	NIL	1(max)	IS3025(part 60) :2008
12.	Calcium as Mg(mg/L)	560	34.00	75(max)	IS3025(part 40) :1991
13.	Magnesium as Mg(mg/L)	138.51	12.15	30(max)	IS3025(part 46) :1994
14.	Coliform MPN (No. per 100ml)	NIL	NIL	NIL	IS 1622:1981
15.	E.Coli (per 100ml ml)	ABSENT	ABSENT	ABSENT	IS 1622:1981

V. CONCLUSION

This paper has presented a water purifier by different purification layers which solve the problem of water purification in rural areas by lowering the parameters that affects the health of the consumer. This water filter will make an impressive mark in the field of purification.

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