

A Research Paper on Water Filtering Mechanism

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ABSTRACT: *In modern times, we all know that the effects of climate change, population growth, and pollution are rapidly threatening the world's water supplies. If the world's population rises day by day, there is a persistent challenge to how to access adequate water to meet the needs of humans while protecting the integrity of marine ecosystems. The entire world is working around the globe on water resource problems. The impurity in the river, which renders the water toxic to drink, is also dissolved due to acid rain in cities that are also the cause of contaminating our groundwater and industrialization along the river bank. This paper has established a method for water purification based on the. This technology can allow all groups of people to drink safe and balanced water, such as lower class communities, middle class populations, hostel students, trekking tourists, etc. This tool is readily accessible, easy to use and less costly.*

Key words: *Osmosis, purify, bottle cap, filtering unit, multiple layer, water purification, pollution, health care.*

INTRODUCTION

The World used to be a very violent planet, but now, after 4.5 billion years, it has become a temperate planet with water and hospitable life covering 75% of the Earth's surface [1]. At least 3.5 billion years ago, the earliest accelerated signs of life on Earth took place. A total of 1.3 million species have been recognized today, but most remain on earth. It has been calculated by the experts that about 8.7 millions of species live on the earth. We, the modern human, have a part of the history that exists only from the last 200 thousand years which is a very short period of time in comparison to the first life forms on the earth. All life forms require water, life without water on the earth is not possible. Its origin on earth, subject of significant body of research in many scientific fields. Earth is one of the unique planets in the solar system involving oceans with liquid water on the surface.

Liquid water continues to exist on the surface of the earth as the planet is distant enough from the sun that it doesn't lose water to runaway greenhouse effect, but not so far that low temperature causes all the water in the planet to freeze. As we know that 71 percent of the Earth's surface is covered with water but only 2.5% of water present in the earth is freshwater wherein from that fresh water percentage the 98.8% of the water is in the form of ice. Therefore, on the surface of the planet, only 0.3 percent of the water is fresh. Approximately 840,000 people die per year from the cause of water disease from the estimated percentage of water in the world, but looking at the current situation, a single drop of water is worth more precious than the sack of gold to desired people.

A big number of the population is dying now with the scarcity and unclean water [2]. So, water purification is really important. In the world, there are a lot more purification systems, including aqua-guard, Aro-purifier, but as it is very expensive to set up in all the houses. So to prevent this problem this paper has introduced where the bottle cap has the filtering unit installed in it to purify the water. This technology is cost effective, easy to use and has a four layered system which the water purifies and the user only has to open the cap and insert the water, and then the water becomes pure by means of various processes. The bottle has a cap on the bottom where the filter is attached to the bottle. The bottle is removed upside-down for the filtration process where some water is applied by opening the cap at the bottom, the water goes through the filtration process that takes a reasonable amount of time to filter. Turn the bottle and glow a led bulb that shows the presence of distilled water in the bottle for drinking when the water is ready filtered. The user will then open the cap to drink [3].

REVIEW OF LITERATURE

In this state of the art, N. From Daels et.al. The goal is to research and evaluate the use of functionalized electro-spun nanofiber microfiltration membranes for water purification, spun by a revolutionary electrospinning process. Since the development of electrospinning techniques for the production of flat sheet membranes and the application of these membranes in water filtration and disinfection are part of this experiment layer. Various functionalizing membrane namely (Nano silver, bronopol, WSCP) were evaluated initially in very less time of experiments. The most performing agent (WSCP) resulted in a 5.2 log₁₀ colony forming unit's removal per 100 ml (CFU/100 ml) hospital wastewater when a 5 omf % WSCP functionalized membrane was applied. Long term lab scale tests showed a 5.6 log₁₀ CFU/100 ml removal for *Staphylococcus aureus* and a 4.0 log₁₀ CFU/100 ml removal for *Escherichia coli*, indicating a better removal of Gram-positive bacteria. Leaching experiments showed a 10% wash-out of the applied functionalizing agent. This leaching did not obstruct the pathogen removal capacity of the functionalized nanofibers. Further research should be conducted towards the reproducibility and controllability of electrospinning of functional nanofibers [4].

Atul J. Dhavale et al in this experiment. A mechanism has been carried out to test the filtration efficiency of the Needle Punched Nonwoven fabric, which has 200 GSM for commercial water filter applications. 200 GSM Needle Punched Nonwoven Fabric Water filtration output made from Polyester and Polypropylene with 3Denier, 6Denier with a 25 percent proportion each showed improvement in water quality parameters within the permissible limit [5]. In this essay, Mark D. Sobsey illustrates that people in the developing world lack clean water, which causes a massive burden of diarrheal disease and other crippling, life-threatening diseases.

Water treatment point-of-use (POU) technology has emerged as a solution that empowers individuals and societies without access to clean water to improve the quality of water by handling it in the home. There are many POU technologies available, but no continuous, large-scale use has been achieved except for boiling. Sustained use is essential if household water treatment technology (HWT) is to provide continued protection, but it is difficult to achieve.

The most effective, widely promoted and used POU HWTs are critically examined according to specified criteria for performance and sustainability. Ceramic and bio sand household water filters are identified as most effective according to the evaluation criteria applied and as having the greatest potential to become widely used and sustainable to minimize waterborne illness and death in order to improve household water quality [6].

Sand Strainer: The primary layer is the sand strainer layer, a method for removing particles of sand or sediment from the water. The sand strainer eliminates the suspended impurities up to 5 microns in size to purify the water as the water is inserted through the bottle cap. Basically, this layer is a disk-like structure consisting of a small pour that will not allow the sand particle to cross it. To strain the stream, the strainer material consists of stainless steel [7].

Activated Charcoal Sheet: The second layer is an activated charcoal sheet which, in the absence of oxygen, needs heating to very excessive temperatures of carbon-rich materials, such as peat, wood, coconut shells, or sawdust. Activated charcoal, via the adsorption process, works. The dissolved chlorine and other chemical impurities are bound by adsorption. The pores in activated charcoal raise the surface area of the charcoal to an extended degree, which significantly enhances the efficacy of its adsorption. The charcoal layer extracts contaminants, such as volatile organic compounds and chlorine, from the water. The advantages of using activated charcoal are that "good stuff" is not removed, it makes the water safe by adding essential minerals such as calcium, magnesium, iron back to the water, it enhances water flavor, and it is inexpensive [8].

Filtering Membrane: Filtering membranes include a number of filtration materials, such as ultrafiltration, microfiltration, Nano filtration, reverse osmosis, a film-like micro-porous membrane that makes only molecules of water and molecules of the same size as molecules of water. It separates the poisonous or heavy molecules that have been added due to sediment or organic material suspended from soil erosion in the water of lakes, rivers, and streams that are hazardous to our health.

Ultraviolet Light Emitting Rod: The most effective method for disinfecting bacteria that destroy the germs from the water up to 190nm-400nm wavelength is ultraviolet water purification. Ultraviolet rays enter the water of our home with dangerous bacteria and kill microorganisms that cause disease by attacking their genetic center (DNA). In eliminating their ability to replicate, this is extremely successful. UV filtered water is free of bacteria, viruses, and protozoa such as E that cause deadly diseases. Coli, salmonella, cryptosporidium and other bacteria responsible for waterborne diseases such as typhoid, dysentery, flu, cholera, coliform, meningitis, giardia, infectious hepatitis, etc. UV washing should not make the water taste or smell poor. After this final filtration process, the water is collected for drinking purposes in the lower portion of the container. A battery is mounted to power the device to control this whole process, a button to start the process and a glowing indicator to indicate whether water is filtered or not.

CONCLUSION

We know that water is the most ingested substance on the planet, although most people are unaware about how harmful water can be, even using iodine, chlorine and chlorine dioxide disinfectants. Since the above substances are still poisonous and hazardous to humans, animals and our climate, life can also be at risk. Some disinfectants can eliminate such contaminants from water, but it cannot be the method of natural water purification of the planet. With the eruption of volcanoes and rising factories, fresh water on earth is polluted at an alarming pace. So the water purification process is now in our hand with the fresh invention process. The technology described in this paper demonstrates water purification by using the four-layer sand strainer, activated charcoal sheet, filtering layer and ultraviolet light, which helps convert impure to pure water purifier to solve the problem of drinking water in college hostels (because many students are from different places and it is very difficult to be comfortable in college hostels). Since the topic focuses on supplying people with safe water, it addresses major concerns.

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