

A Solar Water Purifier

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Abstract: Water is one of the most essential elements for the living creature. No living being cannot survive without drinking water. The pure water is required for drinking and every day purpose. But as the result of increasing population and industrialisation, the pollution of water is also increasing day by day. This project aims to supply purified water to the rural area as well as in the civilisation. The methods and the other aspects are described in our proposed paper.

Keywords: Pollution, pure water, rural area, sustainable resource, solar panel, RO technology.

I. INTRODUCTION

Water has the most important role in every living beings' life on this Earth. The $\frac{3}{4}$ of Earth is covered with water which means there is 70% of water and 30% is land of this Earth surface. Pure water is required for every human being as well as all the living creatures. But at present the water pollution causes the discrimination of pure water on the Earth surface. In future this may cause a great harm for every mortal being. To wind up this danger we should find the way of getting more pure water as we can.

Water purification is the process of removing undesirable chemicals, biological contaminants, any bio-organisms, suspended solids as well as gases from water. As per the survey every year around 3,575,000 people dies from water related diseases all over the world. That is why we should use pure water for our daily life to reduce the death rate due to dirty water. There are many water purifiers available in the market which uses electric power to operate. As there are such places in our country where electrical power cannot reach, that's why the people in urban area can't use water purifier as a result suffers from water diseases.

A solar water purifier can resolve this problem within their reach. Though there is a lack of electricity in such urban areas, but the presence of plenty solar energy can be the source for the energy for operation

a water purifier. Not only in urban area can the solar water purifier also be the sustainable purifier which will reduce the electricity burden in civilisation also. There are many common traditional techniques are adopted the people of rural area. Such as:

- Filtration along Winnowing Sieve: By this method the air-borne impurities can be filtered; such as dry leaves, stalks, and coarse particles. The dirty water is passes through a winnowing sieve and the impurities are filtered. But in this method muddy or highly impure water cannot be purified, as the sieve cannot purify the fine particles from the water.
- Filtration through clothes: Another traditional method of water purification is using the clean clothes. In village or urban areas, a piece of thin cotton cloth is used as the purification medium. With clothe purification method plant bacteria, dust particles, mud or insects can be purified from water.
- Filtration through mud vessels: This is another common purification method which is also adopted in urban areas. The heavy muddy water is kept any mud vessels which allow to sediment the bigger particles on the lower surface of the pot. That's how they get relatively pure water from the upper part of the vessels.

But in these three traditional methods of water purification method in no one method can give the pure water from chemically impure water or can purify any harmful bio micro-organisms. These impurities causes sever water diseases which can also lead the human being toward death.

II. METHODOLOGY:

Proposed method: In this paper we are proposing a better water purification method instead of tradition

water purification method. The components of this method are as discussed below:

- *Reverse Osmosis*: When two solutions of different concentrations are separated by a semi-permeable membrane, solvent (water) flows from a region of lower concentration to higher concentration. This process is called osmosis. This driving force in this called osmotic pressure. If a hydrostatic pressure in excess of osmotic pressure is applied on the higher concentration side, the solvent flow is reversed i.e., solvent flows from higher concentration to lower concentration. This process is called reverse osmosis. Thus, in the process of reverse osmosis pure water is separated from salt water.

Reverse Osmosis

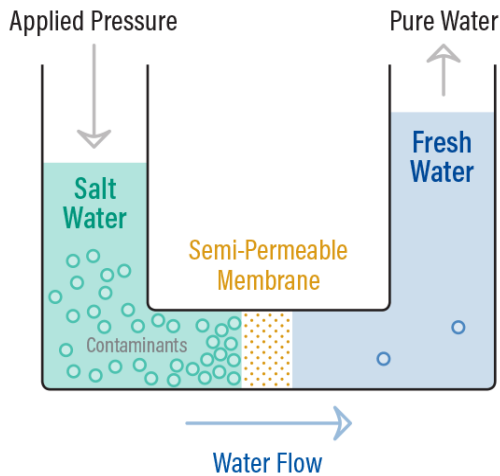


Figure 1: Reverse Osmosis

- *UV purification*: Is the invisible form of electromagnetic radiation that has a shorter length than the light humans can see. It has more energy than visible light & can sometimes break bonds between atoms & molecules, altering the chemistry of materials exposed to it. UV light also produces fluorescence.

The UV treatment process is an extremely rapid physical process, that causes a molecular rearrangement of the genetic material, known as DNA, of microorganisms which renders it inactive and incapable of causing infection.

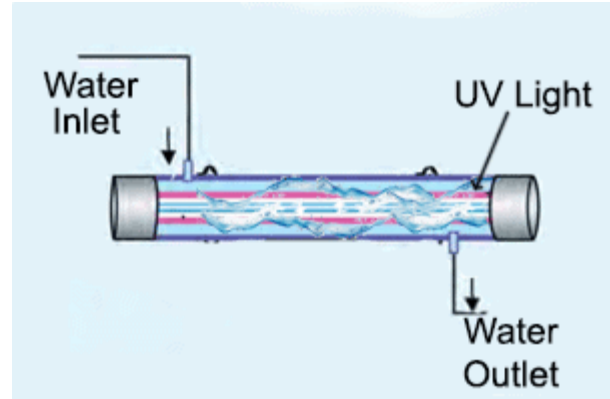


Figure 2: UV Water purification

- *Solar energy*: To operate these two process a stable energy source is required. Solar energy can be used as the sustainable energy resources in this purifier. The solar power where sun hits atmosphere is 1017 watts, whereas the solar power on earth's surface is 1016 watts. The total world – wide power demand of all needs of civilization is 1013 watts. Therefore, the sun gives us 1000 times more power than we need. So, the solar power can be used instead of the electric power to the water purifier.
- *Solar panel*: Though the solar energy is the huge resources of power for the water purifier, we cannot use the solar energy directly under the sun. For this solar panel is required. The solar panel absorb the solar energy from the sunlight and convert it into electrical power. This power helps to operate the components of the solar water purifier.



Figure 3: Solar Panel

III. CONCLUSION

As all the resources which are used to generate the electricity, are limited. The limitation of the energy resources can be a greatest challenge in future. In this situation solar energy can be the sustainable energy resources instead of coal. Also, in the rural area and

in any disaster area solar energy can be the source of the water purifier. As the solar energy is the natural source which is inexhaustible, this technique is cheaper than any other purifier. So, this solar purifier is affordable to all the people of our society. Moreover, reverse osmosis is a good disinfectant process. This project has only capital cost and almost no running cost. Hence, it will prove to be useful in the near future.

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