

EXONERATION OF WASTE WATER WITH SOLAR ENERGY

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Abstract— Water is the most important aspect of life on earth. Despite its abundant availability, small percentage be able to use for the purpose of drinking (about 1%). Solar water exoneration comes in the form of a harmless and promising contrivance that purifies water which use a source of renewable solar energy. By rising the collective cause of solar radiation, the competence of solar water exoneration equipment can be increased, which is a mutual outcome of solar radiation, and provides additional heat by solar water preheating system. The main purpose of this effort is to disinfect the water from wastewater using cosmological energy with the course of action of embodiment. This system is proposed to be experimentally created for this purpose.

Keywords: preheating, renewable energy, embodiment, water

I. INTRODUCTION

Fresh water wherewithal are usually available in river, lake and subversive reservoirs. About 71% of the planet is engrossed in water, yet 96.5% of this planet is bring into being in oceans, 1.7% in ground water, 1.7% in glaciers and ice peels and 0.001% in the air[7]. Only 2.5% of the earth is of sweet water and 98.8% of that water is in frost and ground water. At least 1% of all potable water is in rivers, lakes and atmosphere.

Solar embodiment is on the whole consistent, least expensive method to purify the most well-polluted water of 99.9%, specially in developing country where fuel is rare or very expensive[6]. Solar embodiment is use to produce ingestion water or produce untainted water for lead acid battery, laboratories, hospitals, and to make mercantile[8] commodities such as rose water. In conventional boiling distillation, consuming three kilowatt water per gallon is consumed, while solar distillation only uses free pure power of the sun. Expensive filtration and deionization systems are even more expensive to purchase and use and will not completely clean the water by removing all contaminated substances. Still no additional heat or electrical energy is needed and even after the sun sets, slow distillation continues in the night[5]. Solar water refinement include two aspect; The primary facet is to remove sediment using carbon filter, which is due to manifold pathogenic eradication due to the heat produced by innate convection due to parabolic gutter. The preliminary filtration is done by a filter by carbon[10]. Carbon filtration is a way of filtering, a chemical of

carbonated adsorption and a bed of activated carbon to confiscate impurities.

II. LITERATURE REVIEW

The unclean and waste water can be purified by removing the impurities and salts present with the help of RO process[1]. For the cost effectiveness the process can be structured and practically proved with the help of cosmological treatment in the form solar energy. A thermal membrane embodiment[2] is compared with the reverse osmosis and generated a path for the development of the novel system for the effective purification[9]. The dynamic solar mechanism for the sewage water treatment can also be achieved where the distilled water can be reused for various purposes[4]. Even a small amount of water content will be very helpful for cumulatively large purpose[3].

III. METHODOLOGY

Proposed System

The propose system for solar water purification is done to diminish the total equipment cost, it leads to reach the people who are unable to acquire expensive refinement system and it will function on solar energy i.e., environment affable and healthy. Finally the solar water purification system generates pure drinking water within a less time and within a less equipment cost.

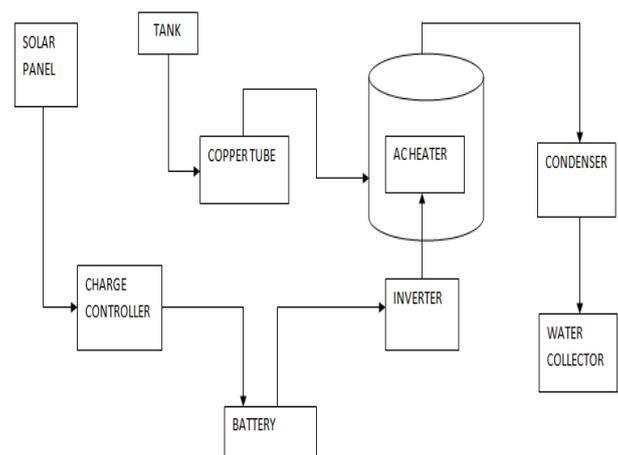


Fig 1: Block Diagram for Exoneration of Squander Water

The solar water purification system is assembled with many elements to get the untainted drinking water. To get a

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better understanding, a block diagram is shown below.

Table 1: Components and Specifications

Name of the Component	Specification
Solar Panel	75Watts Capacity, 4 Amps Output, 21Volts Voltage
Solar Charge Controller	21 Volts input & 12 Volts output
Inverter	900 Watts, 230Volts
AC Heater	500 Watts
Storage Tank	25 liters
Heating Chamber	Aluminum, 3 liters
Insulation Box	15x15x33cm
Condenser	27x17x17cm
Battery	Lead Acid Rechargeable, 100AH, 12V

Procedure

Water is stored in the storage tank and it will flow to the copper tube from the hose pipes, in the copper tube the water is get heated by absorbing the heat from the sun light up to 30-40o C and it will flow into the heating aluminum chamber. The pre heated water gets heated and vaporized in the heating chamber by the AC electrical coil placed in it. The vapors are collected from the heating aluminum chamber and passes through the thermal pipe, which has the capability to with stand the more than 100°C temperature. Thermal pipe is connected to the condensing coil and the vapors are liquefied in the condenser and finally the clean and purified drinking water is collected into the tank. The entire setup can be seen in Fig 1.



Fig 1: Experimental Setup of the Proposed System.

The high intensity solar energy is converted into electrical energy by the solar panels and this electrical energy is connected to the solar charge controller. The solar charge controller controls the energy fluctuations and inverter is connected to the charge controller by the cables. In inverter the generated DC power is converted into AC power and connected to the AC heating coil which is located in the heating chamber.

In between the solar charge controller and inverter battery is connected to store and to supply generated DC current based on requirements

IV. RESULTS AND DISCUSSIONS

The time taken for the certain quantity of collecting the water after the filtration process is seen in Table 2.

Table 2: Time taken to collect the filtered water.

S. No	Time in min	Obtained water in ml
1	15	85
2	35	117.5
3	55	175
4	75	280
5	95	450
6	115	715
7	135	1050
8	155	1450

The water in the copper tube is taken 15 minutes to pre heat by the sun light and 15 minutes to boil in the heating chamber and then starts conversion of water into vapors by further addition of heating.

The minimum time to start the water to boil is 15 minutes it evaporates when the temperature reaches the 100°C . Then the water is slowly converted to vapors. When the temperature increases gradually production of distilled water also increases gradually. See Table 3 for the different water samples.

Table 3: Properties of different water samples

S. No	Property	Bore Water	Drinking Water	Distilled Water (Conventional) Range	Purified Water
1	p ^H	7.62	6.46	5.6 to 7	5.8
2	Oxidation Reduction Potential in mV	-43	+23	-158 to +158	+53
3	Salinity in ppt	2.57	0.16	<0.5	0.1
4	Conductivity μs/m	3140	189	100 to 400	125
5	TDS in ppm	1820	111	<50	25
6	Dissolved Oxygen in ppm	4.6	5.3	5 to 6.6	5.5

Practically 1450 ml of water is unruffled from 1.85 litres input water in 2hr 40min time with a wastage of 400ml but when compare to solar stills it gives faster output.

In this project the output temperature greater than 100°C kills the bacteria and total impurities which is better than solar stills. From this experiment it is observed that properties of purified water achieved from experiment have given best results as compared with both bore water and drinking water.

However the properties of this purified water lies in the

range of conventional distilled water.

V. CONCLUSION

The normal water gets purified with a low amount of cost and the values are completely checked in a different ways to know the properties there in the purified water and these are compared with the bore water, drinking water and distilled water. The properties of this purified water lies in the range of conventional distilled water.

The total experiment is fabricated with in a low cost, so it is easy to put in pure peoples house also. it is economical in financially, efficient in working, eco-friendly.

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