Experiment and comparison variable geometry for solar distillation system

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***Abstract*:**Water is the main important part of the human nature. There are 97% brackish water or saline water in thesea area. There are around 3% water is the portable to the using the human facilities. So, now solar distillation system is the converted to the saline water to the portable water. Here there are many geometry Experiment to increasing the portable water through the solar still. Portable water is the best option to the drinking water. There are many humans prefers boiling water for drink. So, that some impurities and salt is the bottom surface of the solar still. There are solar still bottom surface is the black painted to the good absorptivity.

Keyword: *solar still, condenser, insulation.*

1. Introduction

More than two-third of the earth's surface is covered with water. Most of the available water occurs either as seawater or icebergs in the Polar Regions. About 97% of the earth's water is salty, while the rest is fresh water, of which less than 1% is within human reach. This small percent is still adequate to support life on earth and is replenished through a large scale solar distillation process through what is known as the hydrological cycle. Distillation is one of many processes that can be used for water purification. Most commercial stills and water purification systems require electrical or other fossil-fueled power sources. The use of electricity in distillation apparatus, like in fractional distillation, is energy intensive.

Fig..1 Impotence of water.

Air pollution, acid rain, global warming and climate change are but a few of the consequences that are attributed to use of fossil fuels and have been widely investigated.Distillation is one of many processes that can be used for water purification. Most commercial stills and water purification systems require electrical or other fossil-fueled power sources. The use of electricity in distillation apparatus, like in fractional distillation, is energy intensive. Air pollution, acid rain, global warming and climate change are but a few of the consequences that are attributed to use of fossil fuels and have been widely investigated. So, now solar distillation system is the converted to the saline water to the portable water. Here there are many geometry Experiment to increasing the portable water through the solar still. Portable water is the best option to the drinking water. There are many humans prefers boiling water for drink. So, that some impurities and salt is the bottom surface of the solar still. There are solar still bottom surface is the black painted to the good absorptivity.

2. Improved Solar Still for Water Purification

A solar still is an artificial water purifier that imitates the natural mechanism used by nature to purify water. Like the natural hydrological cycle, the sun drives the process of purification. A solar still distills water-using energy from the sun.The sun evaporates dirty water, which is then cooled and collected in pure form. It does not use fossil fuels as a form of energy. Unlike many artificial methods of purifying water, solar stills use solar energy to purify water. The obtained purified water is potable – safe for using purpose. There are many geometry to improving the water purification rate to as compare to the standard. A basin of solar still has a thin layer of water, a transparent glass cover that covers the basin and channel for collecting the distillatewater from solar still. The glass transmits the sun rays through it and saline water in the basin or solar still is heated by solar radiationwhich passes through the glass cover and absorbed by the bottom of the solar still.There are double slope type solar still geometry is the increasing the productivity of the portable water. The main principle is that double slope solar still has double slope in the inlet solar still like dual process to the solar basin in the solar still.

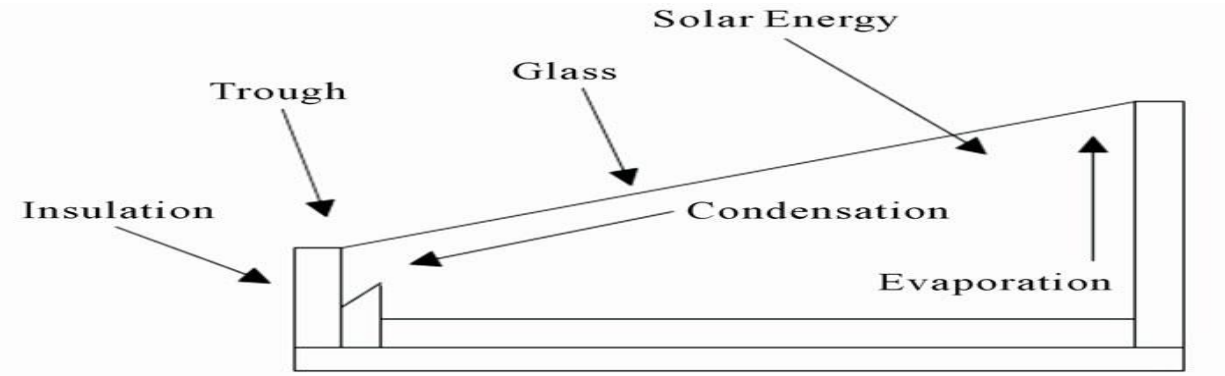

Fig .2 Objective of the solar still

3. Principle of the desalination system:

Interest in the simple solar still has been due to its simple design, construction, and low operating and maintenance costs, mainly in remote areas far from an electricity supply grid. However, its low productivity stimulated the development of methods to increase its efficiency. Among the methods used are those concerned with cooling the glass cover. As the water vapor condenses on the glass cover, its latent heat is released to the glass cover, which increases the cover temperature and lowers the temperature difference between the water in the basin and the glass.

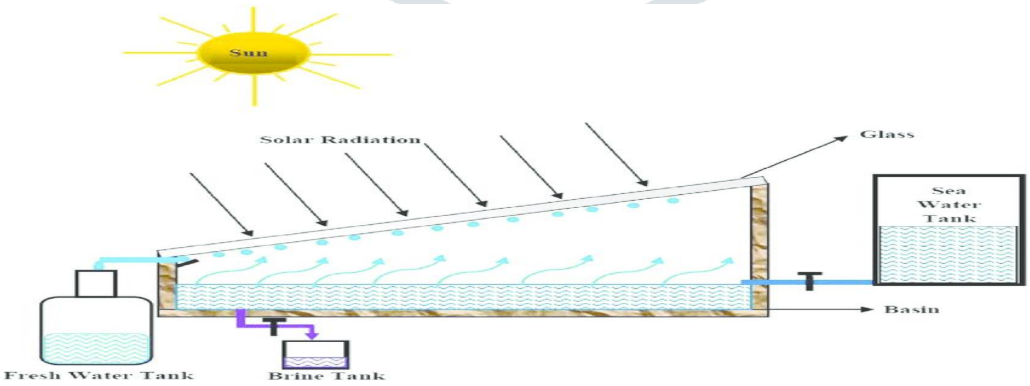

Fig .3 Single Basin Solar Still

This research was aimed at comparing two conventional stills that were fabricated in a similar way differing only in the way they were painted in their internal surfaces. They were installed at the same place, facing north, so that they were subjected to same climatic conditions. In this study two conventional stills were constructed that differed in their absorptivity and reflectivity of the inside surface of the stills. One of the stills was painted white on the internal surfaces of the walls of the

box. This was in order to reflect the incoming solar radiation to the feed water with an attempt to increase the water temperature.The main objective of this work was to study the effect of fin configuration parameters on the finned plate single basin solar still performance. The still was investigated experimentally and theoretically to study the effect of the fin configuration parameters on the stillperformance. The effect of the shadow area of the fins on the amount of solar radiation available for water evaporation and hence, its effect on productivity was investigated. So far, the effects of fin configuration parameters and fin shadowarea on productivity and efficiency ofsolar stills were not investigated in previous work.

4. Objective:

Comparison of the normal type of the solar still to the variation in modify type of the solar still. After all there were increasing the productivity as compare to the normal solar still. Because there are increasing the inlet temperature, inlet volume of the solar still, angle performance of the condense and absorptivity of water. So, after all we are variation in the height cover like 0cm (standard), .0.5cm and 1cm. To put the slab on cover side of the solar still and increasing the inlet volume of the solar still. There water depth is the same as per standard. our experiment to the variation of the height and assuming the weather condition is the same and timing of experiment is 10am to 5pm. Double glass slope is the increasing the inlet temperature.

5. Experimental setup

In this study conventional stills were constructed that differed in their absorptivity and reflectivity of the inside surface of the stills. After study of some literatures and research, articles it is observed that, in solar stll are working on the heating and cooling principle.Solar stills was painted white on the internal surfaces of the walls of the box. This was in order to reflect the incoming solar radiation to the feed water with an attempt to increase the water temperature and at the same time keep thetemperature of the condensing surface low. The basin liner was painted black to increase the capacity of solar radiation absorption. As a control, the other still was painted black on all the internal surfaces of the walls including the basin liner to be consistent with the designs of current conventional solar stills.

- First, the water is evaporated and its stick on the upper slope of the solar still.
- When the heat transfer is convection and radiation toincrease the water temperature and inlet basin temperature.
- Mainly work that to study different height of the slope which is using the check the productivity andexperiment the improve the inlet temperature.

Fig .4 Experimental setup

6. ***Methodology***

- At the beginning of test, the basin will filled with saline water to a demanded level, by using tap valve.
- The period of test will start at 9:00 am and continue until 4:00 pm for differ segments of glass cover height.
- The condensing cover will be clean properly.

- During experimentation, the following parameters were measured hourly.
- Solar intensity, Ambient air temperature,Basin temperature,Distill output,Inner and Outer glass Temperature.

Fig..5 Glass Cover Height of Solar Still Setup.

Experimental Work Schedule			
Glass Cover Height	**Water Depth**		
	10 mm	**20 mm**	**30 mm**
0 mm	**1820** (26-03)	**1970** (27-03)	**1890** (28-03)
50 mm	**2210** (30-03)	**2150** (31-03)	**2070** (01-04)
100 mm	**1850** (03-04)	**1880** (04-04)	**1790** (05-04)

According to the research there were many geometry is the affected to the productivity of the portable water. Optimization of glass cover indication for maximum yield in a solar still. There is inclination of the glass coverfor maximum yield. Increasing the heat & internal heat and glass cover temperature. 40 degree is the inclination of the acrylic cover.Here we compare to the normal solar still and variation of the glass cover solar still. There were same water depth in all the solar still. But there were variation on the height of the glass cover in solar still. 1cm, 2cm and 3cm variation of the height of the glass cover to increase the inlet volume of the solar still. There were increasing the inlet temperature of the solar still. It's Temperature is higher then normal solar still temperature.

7.***Result and Discussion***

Variation of the glass cover height is the increasing to inlet volume of the solar still. To check 50mm height of the glass cover in solar still with same water depth of the basin. 100mm of the height of the glass cover with the same of the water depth in basin and check out to the productivity of the fresh water. Main aim is that to increase the productivity of the portable water. There are variation between different height of the glass cover and water depth of the solar still to varies of the productivity of the water.

Comparison of Solar Distillation System									
Time	**0 mm height**			**50 mm height**			**100 mm height**		
	Yield at 1 cm	**Yield at 2 cm**	**Yield at 3 cm**	**Yield at 1 cm**	**Yield at 2 cm**	**Yield at 3 cm**	**Yield at 1 cm**	**Yield at 2 cm**	**Yield at 3 cm**

	water depth	water depth	water depth	water depth	water depth	water depth	water depth	water depth	water depth
	gram	Gram	gram	gram	gram	gram	gram	gram	Gram
9:00	0	0	0	0	0	0	0	0	0
10:00	21	21	21	21	22	25	65	25	25
11:00	68	72	58	168	220	148	168	220	148
12:00	178	232	141	278	348	248	278	348	248
13:00	247	343	269	447	487	427	447	487	427
14:00	375	412	347	575	602	558	575	602	558
15:00	460	478	394	660	690	620	660	690	620
16:00	380	362	431	580	590	540	580	590	540
17:00	285	290	310	485	512	385	485	512	385
Total	**1820**	**1970**	**1890**	**2210**	**2150**	**2070**	**1850**	**1880**	**1790**

8. ***Conclusion:***

- There is four sides of the collectors to Increase the productivity of the desalinating water.
- Productivity is depends on Geometry, angle of slope, whether condition, intensity of solar radiation etc. of solar still.
- Solar still is the next generation future scope of the water desalination to the purpose of the drinking and using the other sides like industrial, agriculture, commercial portion.
- Solar desalination system purify is use seawater convert to portable water with no other maintenance costs, reliable.

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[10] Fig. (b) https://www.researchgate.net/figure/A-schematic-diagram-of-a-simple-solar-still_fig1_294577641