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EXPERIMENTAL STUDY OF SINGLE SLOP BASIN SOLAR STILL WITH EFFECTS OF PCM AND REFERRAL MECHANISM

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Abstract- Clean, clean water is a basic human need for food and air. Clean water is also needed for agricultural and industrial purposes. Important water sources are rivers, lakes and underground reservoirs. However, direct use of water from such sources is rarely advised, due to the presence of high salts and harmful organisms. The rapid growth of the world's population and industry has led to a dramatic increase in demand for fresh water. A natural resource can meet a limited demand and this leads to severe shortages of fresh water. Therefore, there is an argument that you can actually treat salt and contaminated water in clean water. In this work we can improve solar energy performance using PCM and using Reflector. We also study single and double Slopsolar still.
Key Words: Clean Water, PCM, Solar Energy.

1. INTRODUCTION

India's large and growing population poses significant challenges to all of the country's natural resources. Many water sources are polluted by industrial waste, sewage and agricultural runoff. India has improved its supply of safe water to its people, but significant differences in surveillance are found across the country. The World Bank estimates that 21% of India's communicable diseases are related to unsafe water. In India, diarrhea alone causes more than 1,600 deaths each day (John Briscoe 2005). The average annual rainfall of India varies from 96 cm to 146 cm (Parthasarathy and Dhar 1975).

According to the Metrological Depart of India, most parts of the Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, Mizor, Tripura, West Bengal, Sikkim and Karnataka, Kerala and Lakshadweep receive an annual rainfall of 150 cm. Himachal Pradesh, Jammu and Kashmir, Gujarat, Maharashtra, Andhra, Tamil Nadu, Pondicherry and Karnataka receive annual rainfall of about 100 cm. For the rest of the world, the annual rainfall is 50 cm. The average annual rainfall is estimated at 4000 m3 / year. Only 1000 billion m3 / year is available as groundwater. This figure is about 10-20% of each national consumption in developed countries. Currently, India's water consumption is about 750 million m3 / year in all applications. agriculture, industry, livestock and trade. With the use of water consumption at 1000 m3 / year, the country's water supply is likely to increase exponentially by 2010 otherwise, an increase is currently being planned. In addition, the distribution of space and the diversity of the rainy season are not the same. There are packages such as Saurashtra and Kitch, coastal areas of Tamil Nadu and closed areas in West Rajasthan, AndraPradesh and Marathwada in Maharashtra with little rain and frequent water shortages. In addition, a large number of villages in various parts of the country are known to be affected by excess salt, fluoride, nitrate, iron, arsenic and microbial contaminations of groundwater.

2. LITERATURE REVIEW

Selva kumar et al., (2008) [1] studied the thermal performance of the "V" solin solar type still in coal. Internal heat transfer methods and external heat transfer methods are being studied. Performance measurements, variations of Nusselt (Nu) number, Grashof number (Gr) and heat transfer rates are also calculated. 2. 3. Bharat Kumar Patil, Sanjay Dambal (2016) [2] The main product of Double slop single basin solar is still active when paraffin wax is used. As water production is available in the month of April paraffin wax is 1100ml. Compared to PCM the output is much lower when the black stone was 954ml. But water production was not available without Paraffin wax and not available black stone is 795ml. This comparison is low. The product can still be enhanced by varying the angle of Declination and it is considered that as the sun's rays increase the current temperature and rise and as a result the product rises dramatically.

B. N. Subramanian (2016) [3] Solar emissions are another continuous and attractive way to meet the provision of drinking water in remote areas at very reasonable cost. Heat loss is one of the major factors affecting solar production even now. The aim of this study is to improve the thermal performance and production of a single basin solar base with integrated phase transition elements. The key parameters that affect the performance of the still are actually analyzed. The effect of water depth on iron bars, aluminum and copper basin is still being investigated. It was found that the production of some was still declining with increasing water depth. The highest daily production of 1.39 kg / m2wasobtainw when the water depth is maintained at 10 mm. The use of stearic acid

and paraffin wax as PCM under the liner liner produced daily production still at 164% and 180% respectively compared to non-PCM.

El-Swify and Metias (2002) [4] incorporate the concept of a planer's measurement in showing solar energy. Psychological research and legal testing. It is available in the sense that double exposure still gains more energy on a daily basis than conventional ones.

Singh et al., (1995) [5] analyzed the direction of the glass coating to obtain high yields while still in the sun. The effects of water depth on instantaneous cracks as well as overall thermal efficiency and overall heat transfer co-operation have also been investigated.

El-Sebaii et al., (2000) [6] designed and designed a single basic solar base system with a baffle suspended absorber (SBSSBA) as an alternative heater heating system. The results ended with the daily production of SBSSBA being about 20% higher than normal (SBSS).

One solar-basin solar system is still being developed and analyzed by Mohammed Farid and Faik Hamad (1993) [7] The efficiency is still achieved independently of solar radiation, but the rising radiation leads to a slight reduction in its efficiency. Production is still increasing with increasing temperatures and declining wind speeds.

Hiroshi Tanaka and YasuhitoNakatake (2007) [8] investigate external experiments with sunlight and the proposed effect is still very high in production despite its simple structure.

AvesahemadHusainy (2017) [9] Clean drinking water is a basic human need for food and air. Clean water is also needed for agricultural and industrial purposes. Many water sources are polluted by industrial waste, sewage and agricultural runoff. The rapid growth of the world's population and industry has led to a dramatic increase in demand for fresh water. A natural resource can meet a limited demand and this leads to severe shortages of fresh water.

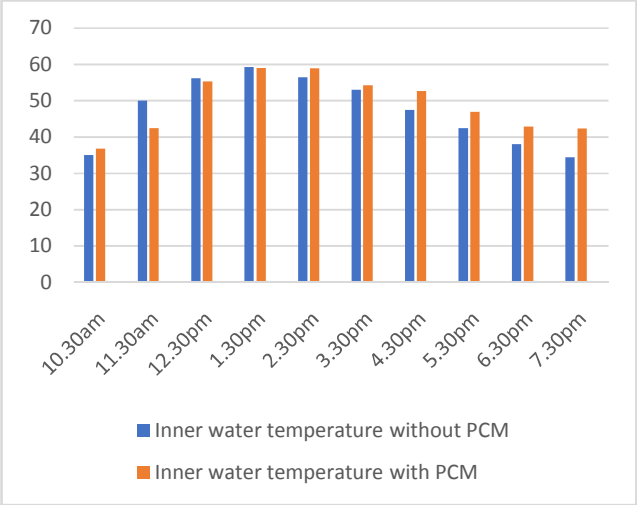
3. METHODOLOGY ANDEXPERIMENTATION

3.1 Comparison of experimental set up of solarstill with and withoutPCM:

Table shows comparison of temp of soap water with and without thermal energy storage. After conducting experimentontwodifferentsetupitisobservedthattemp of impure/soap water is more in case of thermal energy storage setup.

Time in hr.	Inner water temperature without PCM	Inner water temperature with PCM
10.30am	35	36.8
11.30am	50	42.5
12.30pm	56.2	55.3
1.30pm	59.3	59.1
2.30pm	56.5	59
3.30pm	53	54.3
4.30pm	47.5	52.7
5.30pm	42.5	47
6.30pm	38	42.9
7.30pm	34.5	42.3

Table No 1: Comparison of water temp with and without PCM

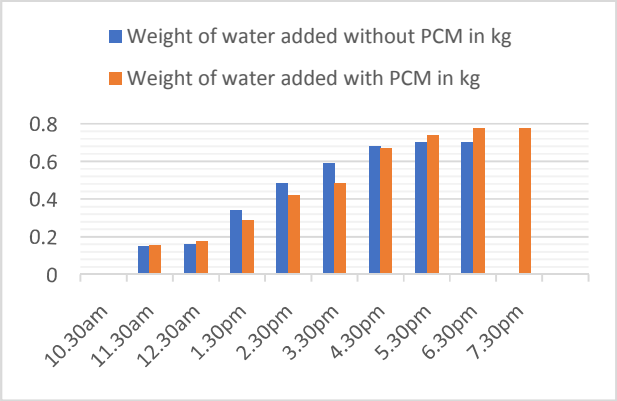


Graph No 1: Comparison of water temp with and without PCM

3.2 Comparison of Weight of water added in perhr with and without thermal energystorage

Time in hr	Weight of water added without PCM in kg	Weight of water added with PCM in kg
10.30am	0	0
11.30am	0.152	0.156
12.30am	0.162	0.176
1.30pm	0.34	0.288
2.30pm	0.484	0.42
3.30pm	0.588	0.484
4.30pm	0.684	0.67
5.30pm	0.704	0.74
6.30pm	0.702	0.778
7.30pm		0.779

Table No 2: Comparison of Weight of water collected with and without PCM



Graph 2: Comparison of Weight of water collected with and without PCM

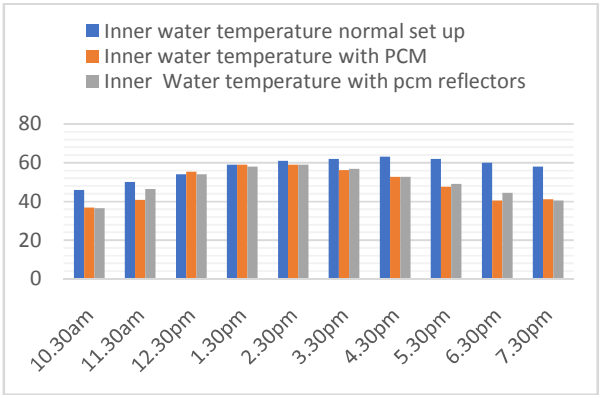
Also, it is observed that with the help of PCM we get more wateroutputandwecanusePCMintegratedsetupevenin evening time

3.3 COMPARISON OF 3 DIFFERENT SOLARSTILL

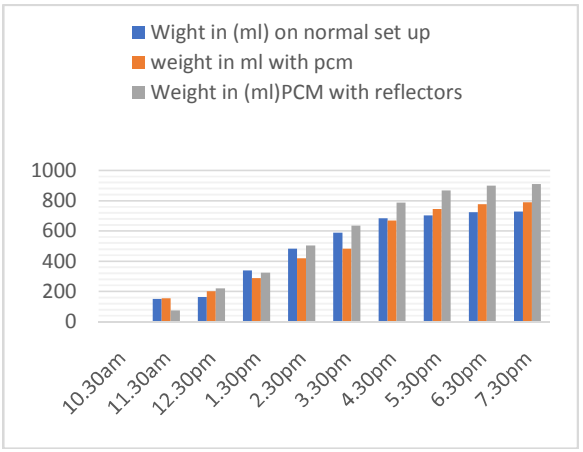
In this experimentation we are comparing solar still with effect of PCM and Reflector. After conducting experimentation, we can observe that Solar still with PCM along with reflector mechanism gives more power output thannormalsolarstill.Also,wecanusePCMintegratedsolarstill duringeveningtimewhensunshineradiationislessor no more. PCM along with reflector solar still gives more efficiency.

Time	Inner water temperature normal set up	Inner water temperature with PCM	Inner Water temperature with pcm reflectors	Wight in (ml) on normal set up	Weight in (ml) With PCM	Weight in (ml)PCM with reflectors
10.30 am	46	36.8	36.5	0	0	0
11.30 am	50	40.8	46.5	152	156	76
12.30 pm	54	55.3	54	164	200	220
1.30pm	59	59.1	58	340	288	324
2.30pm	61	59	59.1	484	420	505
3.30pm	62	56.3	56.8	588	484	636
4.30pm	63	52.7	52.7	684	670	788
5.30pm	62	47.5	49.1	704	745	868
6.30pm	60	40.5	44.4	724	778	900
7.30pm	58	41.1	40.6	727	790	910

Table No 3: Comparison of three different solar still



Graph No 3: Comparison of three different solarstill



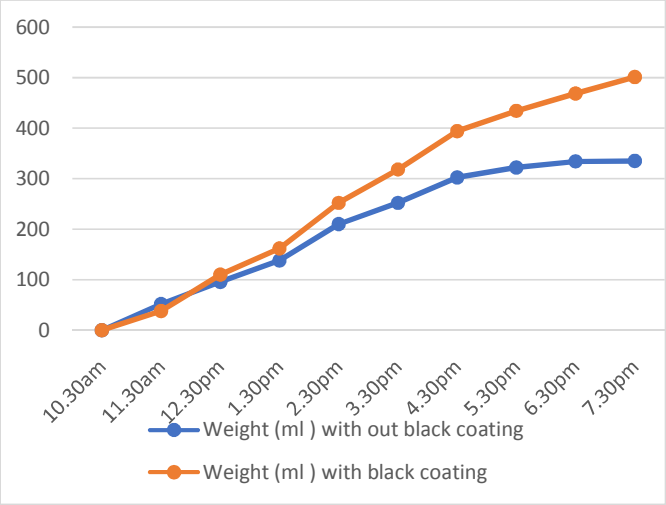
Graph No 4: Comparison of three different solarstill

3.4 EXPERIMENTATION ON SINGLE SLOPESINGLE BASIN SOLARSTILL

Theexperimentwasconductedonsingleslopesinglebasin solar still at the open terrace of the in Miraj area March 2020. Total 6 Lit waste water (soap water) can be used for experimentation. The observations were taken for 9 hours startingfrom10am.Theglobalanddiffusedirradianceson horizontal and irradiances on inclined planes, the temperatures of the atmosphere, condensate andbasin water,andthemassesofrawwatersuppliedandcondensate collected were recorded every 1 hr. The experiments were conductedbetweenthetimeperiodsof10:00amto7:30pm. Temperatureandsolarintensitywasmeasuredinevery1hr with the help of digital temp meter and flux meter resp. Experimentwasconductedontwodifferentsetupswithand without black coating and readings aretaken.

Time	Weight (ml) without black coating	Weight (ml) with black coating
10.30am	0	0
11.30am	52	38
12.30pm	96	110
1.30pm	138	162
2.30pm	210	252
3.30pm	252	318
4.30pm	302	394
5.30pm	322	434
6.30pm	334	468
7.30pm	335	501

Table No 4: Comparison of Single slope single basinsolar still with and without blackcoating



Graph No 5: Comparison of Single slope single basinsolar still with and without blackcoating

4. CONCLUSION AND FUTURE SCOPE

What continues to produce fresh water is by converting water into soap. Distillate production is said to be increased by 10-25% BY PCM

Tests have shown that water is as clean as rainwater and that it is free of harmful salts. It is suggested that for most PCMs, it will still be very effective. The energy-saving devices used in this research program are well-suited to saving in the sun's rays to improve efficiency and efficiency.

1. Compared to a single foundation for the theft of a single foundation using a two-dimensional base system that works effectively.

2. Black coated solar still offers more energy to emit than no black light.

3. Reflector integrated with solar panels still provides more power outages than normal still.

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