INWASCON

***i* TECH MAG**

DOI: http://doi.org/10.26480/itechmag.06.2024.01.05

ISSN: 2710-5873 (Online)
CODEN: ITMNBH

CrossMark

RESEARCH ARTICLE

EXPLORING THE INFLUENCE OF HANGING WICKS ON SOLAR STILL PRODUCTIVITY

Pankaj Dumka[a,*], Dhananjay R. Mishra[a], and Rishika Chauhan[b]

[a]Department of Mechanical Engineering, Jaypee University of Engineering and Technology, A.B. Road, Raghogarh-472336, Madhya Pradesh, India.
[b]Department of Electronics and Communication Engineering, Jaypee University of Engineering and Technology, A.B. Road, Raghogarh-472336, Madhya Pradesh, India.
****Corresponding Author Email: p.dumka.ipec@gmail.com***

ARTICLE DETAILS

Article History:

Received 20 February 2024
Revised 15 March 2024
Accepted 01 April 2024
Available online 05 April 2024

ABSTRACT

In this article, the working of solar still is accessed by augmenting it with hanging wicks. These hanging wicks are inspired by the plant roots. The wicks are made up of cotton cloth which will make the water rise due to capillary action in them and will evaporate quickly due to heat localization on the surface of wick. The still which contains these wicks is called MSS whereas the other one which does not have wick is called CSS. It has been observed that the augmentation of wick has shown a tremendous rise in the distillate during peak radiation hours. The cumulative distillate acquired from MSS is 26.4% more than CSS. Also, the per liter cost of distillate obtained from MSS is 19.4% lower than CSS.

KEYWORDS

Solar still, Solar water desalination, Hanging wicks, Heat localization, Cost analysis.

1. INTRODUCTION

Water stands as the essence of human existence, an essential element whose scarcity poses a threat to life on our planet. Unfortunately, this crucial resource is dwindling rapidly due to the growth of the global population and uncontrolled industrial expansion. Startling statistics released by the World Water Council indicate that by 2025, the available quantity of potable water could decrease from 6600 to 4800 cubic meters (WWC, 2017). It's important to highlight that there exist numerous techniques for water purification, including reverse osmosis and film distillation (Alkhudhiri et al., 2012; Wenten and Khoiruddin, 2016). However, these approaches often face a dilemma as they require significant financial investment and substantial energy consumption.

At this point, the significance of an age-old yet efficient water purification device, known as the solar distiller unit, can be harnessed. This cost-effective apparatus, powered by ample solar energy, was initially developed by Carlos Wilson in 1872 (G. N. Tiwari and Tiwari, 2008). The system he innovated later came to be known as the Conventional Solar Still (CSS) (Ayoub and Malaeb, 2012; Kabeel and El-Agouz, 2011). However, the CSS does have some inherent drawbacks, including its considerable spatial needs and restricted output.

The scientific community has shifted its focus towards enhancing the efficiency of the CSS, exploring a variety of materials and devices (Dwivedi and Tiwari, 2009; Omara et al., 2017; Rahmani et al., 2015; Selvaraj and Natarajan, 2018; Shafii et al., 2017; Sharon and Reddy, 2015; Taghvaei et al., 2014; Tanaka, 2011; A. K. Tiwari & Tiwari, 2006; Xiao et al., 2013). Numerous researchers have proposed various enhancements to improve solar still performance. Jamil and Akhtar's in-depth study has revealed the impact of characteristic dimensions on the daily performance of CSS (Jamil and Akhtar, 2017). Additionally, Afrand and Karimpour elucidated the role of climatic parameters play in the distillate outcomes of a CSS (Afrand and Karimipour, 2017).

Sodha et al. have explored integrating CSS with the earth to tap into ground energy (Sodha et al., 2014). Dumka and Mishra conducted an exhaustive exergy and energy analysis to comprehend the thermodynamic aspects of solar earth stills (Dumka and Mishra, 2018a; 2018b). Have introduced the use of polythene to cover the surrounding ground area of earth CSS to enhance its efficiency (A. K. Tiwari and Mishra, 2014). innovatively integrated CSS with an air compressor, observing a significant increase in distillate production and employed Artificial Neural Network analysis for future performance prediction (Hidouri et al., 2017). This examined the augmentation of fins within the CSS basin, to boost its overall performance, while integrated permanent ferrite ring magnets with CSS to counter water surface tension and act as sensible heat pockets (Rabhi et al., 2017; Dumka et al., 2019). The conducted an in-depth review on techniques to enhance CSS performance while assessed the potential of rectangular porous media to improve CSS productivity (Kalidasa Murugavel et al., 2008; Rashidi et al., 2018). Has its proposed the use of metal chips and common coal within a solar still, suggested employing servo-therm medium oil as a sensible energy storage medium in CSS (Mishra and Tiwari, 2013; Deshmukh and Thombre, 2017). explored the impact of salt-concentration on CSS performance, finding that a concentration of 1% yields maximum distillate output (Dumka and Mishra, 2021).

To explored a passive desalination system incorporating paraffin wax and parabolic-shaped concentrators (Kabeel et al., 2017). Similarly, studied the execution of compound parabolic concentrators (CPC) still using foam impregnated with carbon and insulation (bubble-wrap), extending their study to include a computational fluid dynamics (CFD) (Arunkumar et al., 2018). To examined the use of organic and inorganic phase-changing materials (PCM) to enhance CSS functionality, also evaluating the economic implications of integrating these PCMs into the distiller unit (Kabeel et al., 2018).

The communicated an experimental paper on CSS enhanced with sand and jute knitted sandbags. To investigated the leverage of honeycomb pads to increase the water surface area through capillarity, aiming to boost distillate output from the still (Kabeel, El-agouz, et al., 2018; Kumar et al., 2024). Have reported the use of plexiglass and jute in the CSS to enhance its performance due to heat localization and capillary rise in jute (Dumka et al., 2024).

Cite the Article: Pankaj Dumka, Dhananjay R. Mishra, and Rishika Chauhan (2024). Exploring The Influence of Hanging Wicks on Solar Still Productivity. *i TECH MAG, Vol 6: 01-05.*

In this article, the potential impact of hanging wicks on the performance of CSS was examined. The motivation for this research came from plants, where roots carry water from the ground and distribute it widely through a phenomenon very similar to capillary rise. One can consider these hanging wicks as roots that cause water to rise on them due to capillary action, resulting in a thin-film of water around them. This thin film will evaporate quickly due to heat localization and will result in better yield from solar still. Some noteworthy findings witnessed during the experiments were discussed and reported in the article.

2. EXPERIMENTAL SETUP

Two CSS, having vertical wall lengths of 19.5 and 64.5 cm, were fabricated from fibre reinforced plastic (5 mm thick). The reason for using FRP is its light weight and good thermal resistance. The interiors of the stills were painted black to enhance the absorption of solar radiation. For basin-water, a Galvanized Iron (GI) tray (0.74 mm thick) has been used in the still having basin-area of 1 m^2 and side wall height of 15 cm. It is also coated black for better solar radiation absorption. On the top 4 mm thick clear transparent glass is placed and the side sealing is done with the help of putty. The photograph of CSS is shown in Fig. 1.

Figure 1: Snapshot of CSS

In one of the CSS a frame shown in Fig. 2(b) is placed. The base area of the frame is 0.64 m^2 and the vertical bar height is 12 cm. On the top square ring of the frame GI wires were tied along one direction. In those wires, wicks (Fig. 2(b)) were hanged vertically.

(a) Wick

(b) Frame

Figure 2: Photographs of wick and frame

Since these wicks are made of cotton material, they facilitate water to ascend along their length through capillary action. Consequently, a thin layer of water will cascade onto the wick's surface. When solar radiation reaches the wick's surface or because of the greenhouse effect within the still cavity, the water evaporates rapidly due to heat concentration or localization and the significantly increased surface area resulting from the hanging wicks. In the manuscript, this solar still equipped with hanging wicks is referred to as MSS, depicted in Fig. 3.

Figure 3: Photographs of MSS

Hourly measurements of the distillate were conducted using a graduated cylinder, while solar radiation intensity was measured with a solar-powered meter (TM-207). K-type thermocouples were utilized for temperature readings. Table 1 details the operating ranges, accuracies, and standard uncertainties of these instruments employed in the measurements. The standard uncertainty (u) of an instrument having an accuracy of a is evaluated as: $u = a/\sqrt{3}$ (Holman, 2017; Manchanda and Kumar, 2019).

Table 1: a, range, and u of the measuring devices

Instrument	Accuracy	Range	Standard Uncertainty
Graduated Cylinder (mL)	± 1	0–250	0.6
Thermocouple (°C)	± 0.1	-100–500	0.06
Solarimeter (W m^{-2})	± 10	0–1999	5.77

The experiments were performed in the calendar month of April 2023 at JUET, Guna, India (24°26′07″N 77°09′39″E). In all the experiments the basin water was kept at 40 kg. It choice is based on the previous trial experiments where it has been observed that the wick remain wet due to capillary action when 1/3rd of it is dipped in water. During this investigative research, numerous pivotal measurements were conducted hourly, as outlined below:

- Temperature of basin water (in CSS), inner condensing cover (both CSS and MSS), wick surface (MSS), and surrounding atmosphere.
- Intensity of solar radiation.
- Distillate output

3. COST ANALYSIS

In the cost analysis, the initial step involves assessing the Capital Recovery and Sinking Fund Factors (CRF and SFF). For a life expectancy (n) of the still set at 15 years and an interest rate (i) of 12%, these factors are computed using Eqn. (1) and Eqn. (2) as depicted below.

$$\mathrm{CRF} = \frac{\mathrm{i}(\mathrm{i}+1)^{\mathrm{n}}}{(i+1)^{n}-1} \tag{1}$$

$$\mathrm{SFF} = \frac{\mathrm{i}}{(i+1)^{n}-1} \tag{2}$$

Now, by integrating the values of CRF and SFF with the initial investment and salvage value, one can ascertain FAC and ASV, which represent the first annual cost and annual salvage value, respectively. This process is accomplished utilizing Eqn. (3) and Eqn. (4), respectively. (Dumka and Mishra, 2020).

$$FAC = CRF \times P \tag{3}$$

$$ASV = SFF \times S \tag{4}$$

Following up, to compute the total annual cost Eqn. (5) is used (Dumka et al., 2022).

Cite the Article: Pankaj Dumka, Dhananjay R. Mishra, and Rishika Chauhan (2024). Exploring The Influence of Hanging Wicks on Solar Still Productivity. *i TECH MAG, Vol 6: 01-05.*

$$AC = FAC + AMC - ASV \qquad (5)$$

The AMC (annual maintenance cost) is determined to be 15 percent of FAC. Finally, the per liter cost of distillate is calculated as the ratio of the AC (annual cost) to the AY (annual yield) , as demonstrated in Eqn. (6) (Dumka et al., 2020):

$$CPL = AC/AY \qquad (6)$$

4. RESULTS AND DISCUSSION

Fig. 4 illustrates the change of solar radiation intensity (I) and ambient temperature (T_a) with time. At 9:00 h, the value of I was 497 W/m^2 which rises to a highest value of 987 W/m^2 by 13:00 h. At the peak radiation hour, the surrounding temperature was 36.1°C. Thereafter the radiation gradually decreases and by 18:00 h their intensity diminishes to 17 W/m^2 with surrounding temperature of 25°C.

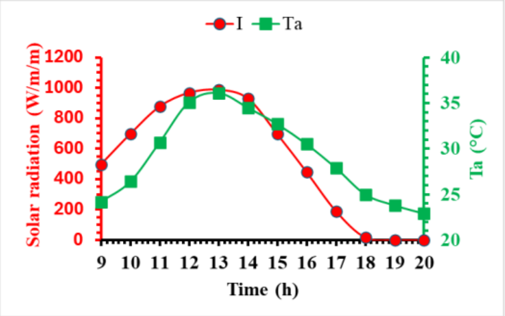

Figure 4: Variation of solar radiation intensity (I) and ambient temperature (T_a)

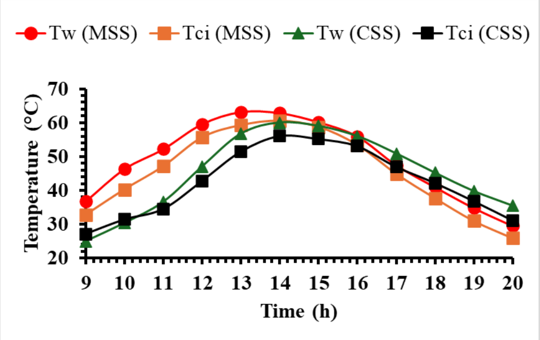

Figure 5: Variation of water (T_w) and inner condensing cover (T_{ci}) temperatures

The change of water (T_w) and inner glass (T_{ci}) temperatures as a function of time for CSS and MSS are presented in Fig. 5. From the start of the experiment till the 14:00 h the (T_w) on the wick (MSS) is more than that of water in CSS. This is due to the heat localization on the wick surface and thin film evaporation. However, in CSS, due to large heat capacity of water, it stores energy till this time. After this time, as the solar radiation intensity falls the water temperature on the wick (in MSS) falls whereas, CSS utilizes its stored energy for the remaining time to keep its T_w more than MSS. At 9:00 h, Tw in MSS leads CSS by 46.8%, which reduces to a value of 11.5% at peak radiation hour, and 0% by 16:00 h. One more thing to observe here is the inner glass temperature. In MSS, T_{ci} is higher than its counterpart in CSS till 14:00 h. This is due to high condensation rate in MSS which has led to the more releases of latent heat of condensation. Thereafter, CSS takes it lead and retains it till the end of experiment.

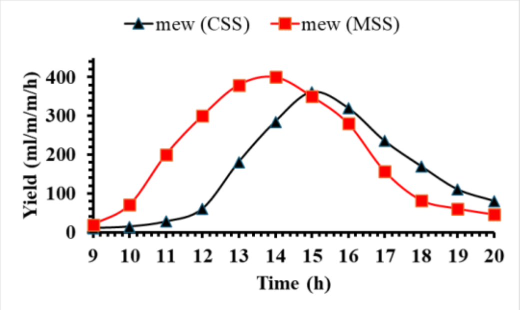

Figure 6: Variation of distillate output of CSS and MSS

Fig. 6 shows the change of distillate output from CSS and MSS as a function of time. As the T_w in MSS is more than CSS till 14:00 h the yield from MSS is much more because more thin film evaporation has taken place due to heat localization and capillary rise in wick. At the star of experiment MSS leads CSS by 90%, which increases to a maximum temperature rise of 640% at 11:00 h. At the peak radiation hour, MSS leads CSS by 109.9%. The CSS attains it's peak value 15:00 h i.e. one hour later as it must be storing energy till this time. After this time, CSS takes its lead, and retains it till the experiment. Form 9:00 h till 14:00 h MSS produced 131% more distillate than CSS. From 14:00 hours until the conclusion of the experiment, CSS consistently maintained a 31% higher yield than MSS. Overall, the cumulative yield from MSS and CSS is 1853 ml and 2343 ml, respectively, indicating that MSS leads CSS by 26.4%.

Tab. 2 outlines the cost breakdown of components for both MSS and CSS, along with their corresponding salvage values. Evaluation occurs following the typical 15-year lifespan, which aligns with the typical longevity of FRP solar stills. Notably, there is a slight disparity in the total costs between MSS and CSS due to the presence of wick and frame in MSS. The cost of MSS totals Rs. 6600, whereas CSS is slightly pricier, amounting to Rs. 7000. All monetary values presented in the table are denoted in Indian Rupees (Rs.).

Table 2: Salvage value and the cost of installation CSS and MSS (in Rs.)

	CSS	MSS	S
FRP	6000	6000	600
Glass	500	500	-
Putty	100	100	-
Wick	-	100	-
Frame	-	300	100
Total Cost	6600	7000	

Table 3: Cost and cost factors for MSS and CSS

	CSS	MSS
CRF	0.147	0.147
SFF	0.027	0.027
FAC (Rs.)	970.2	1029
ASV (Rs.)	16.2	18.9
AMC (Rs.)	145.53	154.35
AC (Rs.)	1099.53	1164.45
AY (L)	555.9	702.9
Total Cost (Rs./L)	**1.98**	**1.66**

Tab. 3 provides a detailed comparison between various factors and costs involved in computing CPL for both the CSS and MSS. The utilization of hanging wicks in the MSS led to a significant decrease of 19.4% in the cost of distillate output as compared to the CSS. This implies that adopting the MSS might prove to be a feasible approach for enhancing both its distillate production and economic efficiency.

4. CONCLUSIONS

Based on experimental results and observations, following conclusions can be drawn:

- The use of a wick in the solar still (MSS) enhances heat localization on the water surface, leading to more efficient thin film evaporation compared to the CSS. This results in higher water temperatures on the wick surface in MSS compared to CSS, particularly during peak radiation hours.
- The inner glass temperature (T_ci) is influenced by the condensation rate within the solar stills. Higher condensation rates in MSS lead to more significant releases of latent heat of condensation, resulting in higher inner glass temperatures until 14:00 h.
- The variation in distillate output from CSS and MSS over time is influenced by the differences in water temperature and evaporation efficiency between the two systems. MSS initially produces significantly more distillate due to its higher water temperature, but CSS catches up and eventually surpasses MSS in distillate production as it utilizes its stored energy effectively.

Cite the Article: Pankaj Dumka, Dhananjay R. Mishra, and Rishika Chauhan (2024). Exploring The Influence of Hanging Wicks on Solar Still Productivity. *i TECH MAG, Vol 6: 01-05.*

- The peak distillate production for CSS occurs slightly later (15:00 h) compared to MSS (14:00 h), indicating the time required for CSS to utilize its stored energy effectively. Cumulative distillate produced form MSS is 26.4% higher than CSS.
- The adoption of the MSS, with hanging wicks, showcases a 19.4% reduction in distillate output costs compared to the CSS, suggesting its potential feasibility in enhancing distillate production and economic efficiency.

ACKNOWLEDGEMENTS

We express our gratitude to our Honorable Vice Chancellor, Professor D. K. Rai, for his unwavering support and guidance throughout the research phase.

REFERENCES

Afrand, M., and Karimipour, A., 2017. Theoretical analysis of various s climatic parameter effects on performance of a basin solar still. Journal of Power Technology, 97(1), Pp. 44–51.

Alkhudhiri, A., Darwish, N., and Hilal, N., 2012. Membrane distillation: A comprehensive review. Desalination, 287, Pp. 2–18. https://doi.org/10.1016/J.DESAL.2011.08.027

Arunkumar, T., Kabeel, A. E., Raj, K., Denkenberger, D., Sathyamurthy, R., Ragupathy, P., and Velraj, R., 2018. Productivity enhanceem ent of solar still by using porous absorber with bubble-wrap insulation. Journal of Cleaner Production, 195, Pp. 1149–1161.https://doi.org/10.1016/j.jclepro.2018.05.199

Ayoub, G. M., and Malaeb, L., 2012. Developments in solar still desalination systems: A critical review. Critical Reviews in Environmental Science and Technology, 42(19), Pp. 2078–2112. https://doi.org/10.1080/10643389.2011.574104

Deshmukh, H. S., and Thombre, S. B., 2017. Solar distillation with single basin solar still using sensible heat storage materials. Desalination, 410, Pp. 91–98. https://doi.org/10.1016/j.desal.2017.01.030

Dumka, P., Chauhan, R., and Mishra, D. R., 2020. Experimental and theoretical evaluation of a conventional solar still augmented with jute covered plastic balls. Journal of Energy Storage, 32(June), 101874. https://doi.org/10.1016/j.est.2020.101874

Dumka, P., Gautam, H., Sharma, S., Gunawat, C., and Mishra, D. R., 2022. Impact of Sand Filled Glass Bottles on Performance of Conventional Solar Still. Journal of Basic & Applied Sciences, 18, Pp. 8–15. https://doi.org/10.29169/1927-5129.2022.18.02

Dumka, P., Kushwah, Y., Sharma, A., and Mishra, D. R., 2019. Comparative analysis and experimental evaluation of single slope solar still augmented with permanent magnets and conventional solar still. Desalination, 459, Pp. 34–45. https://doi.org/10.1016/j.desal.2019.02.012

Dumka, P., and Mishra, D. R., 2018a. Energy and exergy analysis of conventional and modified solar still integrated with sand bed earth: Study of heat and mass transfer. Desalination, 437(July 2018), Pp.15–25. https://doi.org/10.1016/j.desal.2018.02.026

Dumka, P., and Mishra, D. R., 2018b. Experimental investigation of modified single slope solar still integrated with earth (I) &(II) :Energy and exergy analysis. Energy, 160, Pp. 1144–1157. Https://doi.org/10.1016/j.energy.2018.07.083

Dumka, P., and Mishra, D. R., 2020. Performance evaluation of single slope solar still augmented with the ultrasonic fogger. Energy, 190. https://doi.org/10.1016/j.energy.2019.116398

Dumka, P., and Mishra, D. R., 2021. Influence of salt concentration on the performance characteristics of passive solar still. International Journal of Ambient Energy, 42(13), Pp. 1463–1473. https://doi.org/10.1080/01430750.2019.1611638

Dumka, P., Mishra, D. R., Singh, B., Chauhan, R., Haque, M., and Siddiqui, I., 2024. Enhancing solar still performance with Plexiglas and jute cloth additions : experimental study. Sustainable Environment Research, 34(3), Pp. 2–12. https://doi.org/10.1186/s42834-024-00208-y

Dwivedi, V. K., and Tiwari, G. N., 2009. Comparison of internal heat transfer coefficients in passive solar stills by different thermal models: An experimental validation. Desalination, 246(1–3), Pp. 304–318. https://doi.org/10.1016/j.desal.2008.06.024

Hidouri, K., Mishra, D. R., Benhmidene, A., and Chouachi, B., 2017. Experimental and theoretical evaluation of a hybrid solar still integrated with an air compressor using ANN. Desalination and Water Treatment, 88(June 2018), Pp. 52–59. https://doi.org/10.5004/dwt.2017.21333

Holman, J. P., 2017. Experimental methods for engineers. In McGraw-Hill. McGraw-Hill.

Jamil, B., and Akhtar, N., 2017. Effect of specific height on the performance of a single slope solar still: An experimental study. Desalination, 414, Pp. 73–88. https://doi.org/10.1016/j.desal.2017.03.036

Kabeel, A. E., and El-Agouz, S. A., 2011. Review of researches and developments on solar stills. Desalination, 276(1–3), Pp. 1–12. Https://doi.org/10.1016/j.desal.2011.03.042

Kabeel, A. E., El-Agouz, S. A., and Sathyamurthy, R., 2018. Exergy Analysis of Single Slope Solar Still With Low Cost Energy Storage Material. Twenty-First International Water Technology Conference, IWTC21, June, Pp. 28–30.

Kabeel, A. E., El-agouz, S. A., Sathyamurthy, R., and Arunkumar, T., 2018. Augmenting the productivity of solar still using jute cloth knitted with sand heat energy storage. Desalination, 443(May), Pp. 122–129. https://doi.org/10.1016/j.desal.2018.05.026

Kabeel, A. E., Elkelawy, M., Alm El Din, H., and Alghrubah, A., 2017. Investigation of exergy and yield of a passive solar water desalination system with a parabolic concentrator incorporated with latent heat storage medium. Energy Conversion and Management. https://doi.org/10.1016/j.enconman.2017.04.085

Kalidasa Murugavel, K., Chockalingam, K. K. S. K., and Srithar, K., 2008. Progresses in improving the effectiveness of the single basin passive solar still. Desalination, 220(1–3), Pp. 677–686. https://doi.Org/10.1016/j.desal.2007.01.062

Kumar, R., Mishra, D. R., and Dumka, P., 2024. Improving solar still performance : A comparative analysis of conventional and honeycomb pad augmented solar stills. Solar Energy, 270(October 2023), Pp. 112408. https://doi.org/ https://doi.org/10.1016/j.solener.2024.112408

Manchanda, H., and Kumar, M., 2019. Thermo-economic assessment of a novel design of a solar distillation-cum-drying unit. Energy and Environment, 30(8), Pp. 1456–1476. https://doi.org/10.1177/0958305X19851611

Mishra, D. R., and Tiwari, A. K., 2013. Effect of coal and metal chip on the solar still. J. Sci. & Tech. Res., 3(1), Pp. 1–6.

Omara, Z. M., Abdullah, A. S., Kabeel, A. E., and Essa, F. A., 2017. The cooling techniques of the solar stills' glass covers – A review. Renewable and Sustainable Energy Reviews, 78, Pp. 176–193. Https://doi.org/10.1016/j.rser.2017.04.085

Rabhi, K., Nciri, R., Nasri, F., Ali, C., Ben Bacha, H., and Bacha, H., Ben. 2017. Experimental performance analysis of a modified single-basin single-slope solar still with pin fins absorber and condenser. Desalination, 416(April), Pp. 86–93. https://doi.org/10.1016/j.desal.2017.04.023

Rahmani, A., Boutriaa, A., and Hadef, A., 2015. An experimental approach to improve the basin type solar still using an integrated natural circulation loop. Energy Conversion and Management, 93, 298–308. https://doi.org/10.1016/j.enconman.2015.01.026

Rashidi, S., Rahbar, N., Sadegh, M., and Abolfazli, J., 2018. Enhancement of solar still by reticular porous media : Experimental investigation with exergy and economic analysis. Applied Thermal Engineering, 130,Pp. 1341–1348. https://doi.org/10.1016/j.applthermaleng.2017.11.089

Selvaraj, K., and Natarajan, A., 2018. Factors influencing the performance and productivity of solar stills - A review. Desalination, 435, Pp. 181–187. https://doi.org/10.1016/J.DESAL.2017.09.031

Shafii, M. B., Favakeh, A., Faegh, M., and Sadrhosseini, H., 2017. Experimental investigation of a novel passive solar still with additional condensation on sidewalls. Desalination and Water Treatment. https://doi.org/10.5004/dwt.2017.21334

Sharon, H., and Reddy, K. S., 2015. A review of solar energy driven desalination technologies. Renewable and Sustainable Energy Re views, 41, Pp. 1080–1118. https://doi. Org /10. 1016 /j. rser. 2014.09.002

Sodha, M. S., Mishra, D. R., and Tiwari, A. K., 2014. Solar Earth Water Still for Highly Wet Ground. J Fundam Renew Energy Appl, 4(1.e103), Pp. 1–2. https://doi.org/10.4172/2090-4541. 1000e103

Taghvaei, H., Taghvaei, H., Jafarpur, K., Karimi Estahbanati, M. R., Feilizadeh, M., Feilizadeh, M., and Seddigh Ardekani, A., 2014. A thorough investigation of the effects of water depth on the perfor mance of active solar stills. Desalination, 347, Pp. 77–85. https://doi.org/10.1016/j.desal.2014.05.038

Tanaka, H., 2011. A theoretical analysis of basin type solar still with flat plate external bottom reflector. Desalination, 279(1–3), Pp. 243–251. https://doi.org/10.1016/j.desal.2011.06.016

Tiwari, A. K., and Mishra, D. R., 2014. effect of covering by black polythene sheets and coal powder on near by surfaces of sand bed solar still: studying heat and mass transfer. 10th, International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, July, Pp. 514–521.

Tiwari, A. K., and Tiwari, G. N., 2006. Effect of water depths on heat and mass transfer in a passive solar still: in summer climatic condi tion . Desalination, 195(1–3), Pp. 78–94. https://doi.org /10. 1016 /j.desal.2005.11.014

Tiwari, G. N., and Tiwari, A. K., 2008. Solar Distillation Practice for Water Desalination Systems. Anamaya.

Wenten, I. G., and Khoiruddin., 2016. Reverse osmosis applications: Prospect and challenges. Desalination. https:/ /doi.org/ 10.1016/ j.desal.2015.12.011

WWC. 2017. No Title.

Xiao, G., Wang, X., Ni, M., Wang, F., Zhu, W., Luo, Z., and Cen, K., 2013. A review on solar stills for brine desalination. Applied Energy, 103, 642–652.https://doi.org/10.1016/j.apenergy. 2012. 10. 029

◆

Cite the Article: Pankaj Dumka, Dhananjay R. Mishra, and Rishika Chauhan (2024). Exploring The Influence of Hanging Wicks on Solar Still Productivity. *i TECH MAG, Vol 6: 01-05.*