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Solar thermal Applications based on TiO_2/Jackfruit peel nanocomposites

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Abstract:

In the present work synthesize of nanocomposites materials of TiO_2/jackfruit peel (JPT) with a mixture of concentration [0.1%; 0.2% ; and 0.3%]. The morphological and structural properties is examined by the XRD & SEM. Prepared material having structure of porous and crystalline with 86%. cobalt (II) chloride; thiourea; and silicon dioxide blended to hybrid nanofluids with different ratios of 10%; 20%; 30%; 40%; 50% and 60%. Those material enhanced the heat transfer inside the solar distiller achieved the productivity of 8.89 L/m^2 day.

Introduction:

Tiwari and Tiwari [1] developed an improved internal heat transfer of solar distiller. It demonstrated that the existed modeling revealed more accurate values of evaporative and convective HTCs of the solar distiller compared to Kumar and Tiwari model [2]. Sorayan and Shukla [3] developed correlation internal HTCs were shown in fit verification between experimental and theoretical findings. They reported a dunkle's correlations were not valid for the large titling cover of glass and the spacious distance inbetween evaporating & condensing surfaces. Furthermore, Tiwari and Tripathi [4] have experimentally considered water depth about 0.12, 0.1, 0.05m, heat transfer performance of an active solar distiller. It was indicated that the evaporative and convective HTCs between internal cover and water were remarkably affected water of depth of the still. Dwivedi and Tiwari [5] comprehensively conducted and compared several thermal models investigate the heat transfer behavior within passive solar distiller under wintertime & straw-hat with three various aquatic pits (0.03, 0.02, 0.01 m). It was noticed that there was an insignificant effect in the convective HTCs when the aquatic pits are increased about 0.01 m - 0.03 m. similar research suggests that water depth influences an internal mass produced in heat transfer by double, single slope system considered experimentally.

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Fig. 1. Silver balls

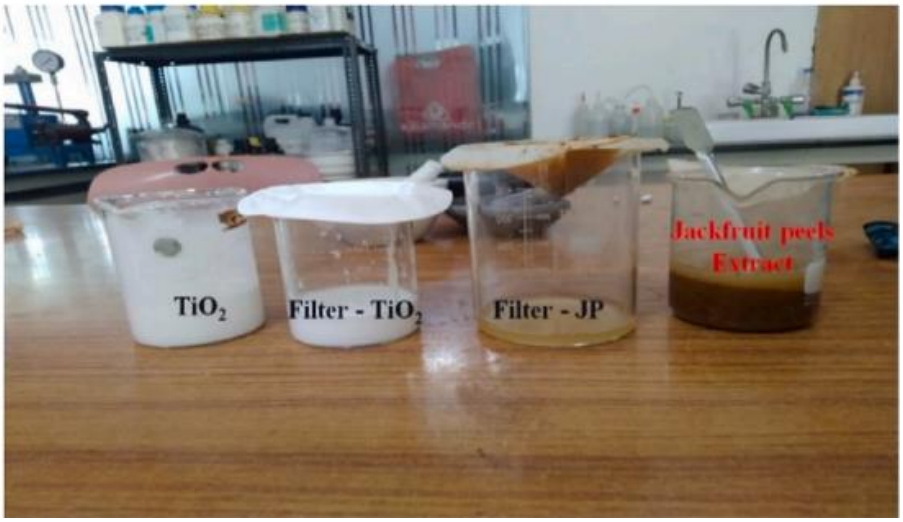

Fig-2. Synthesis process

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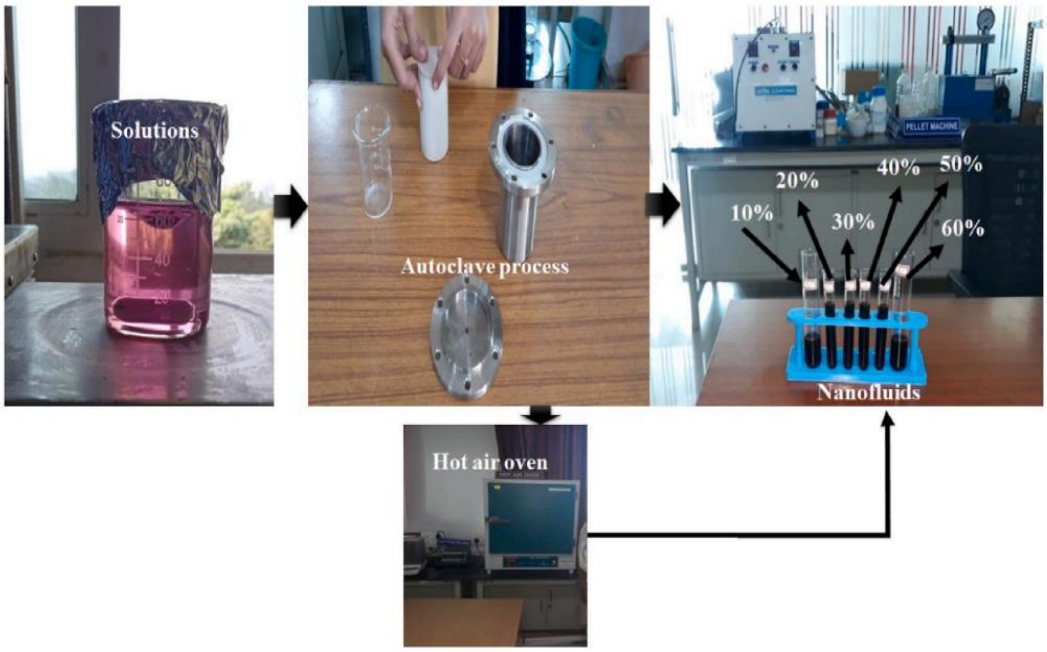

Fig-3. Hydrothermal - techniques.

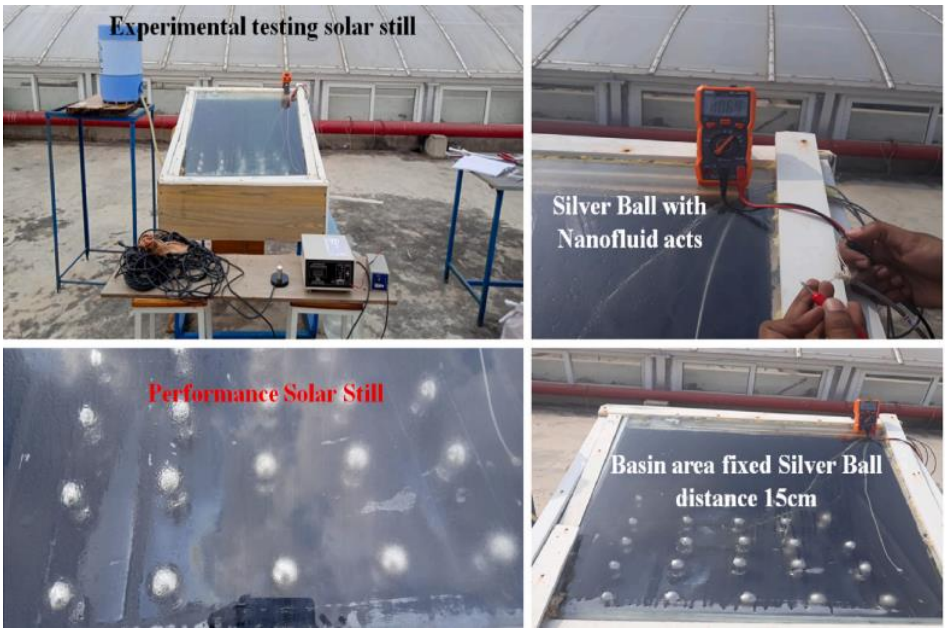

Fig- 4 Experimental testing PSBSS.

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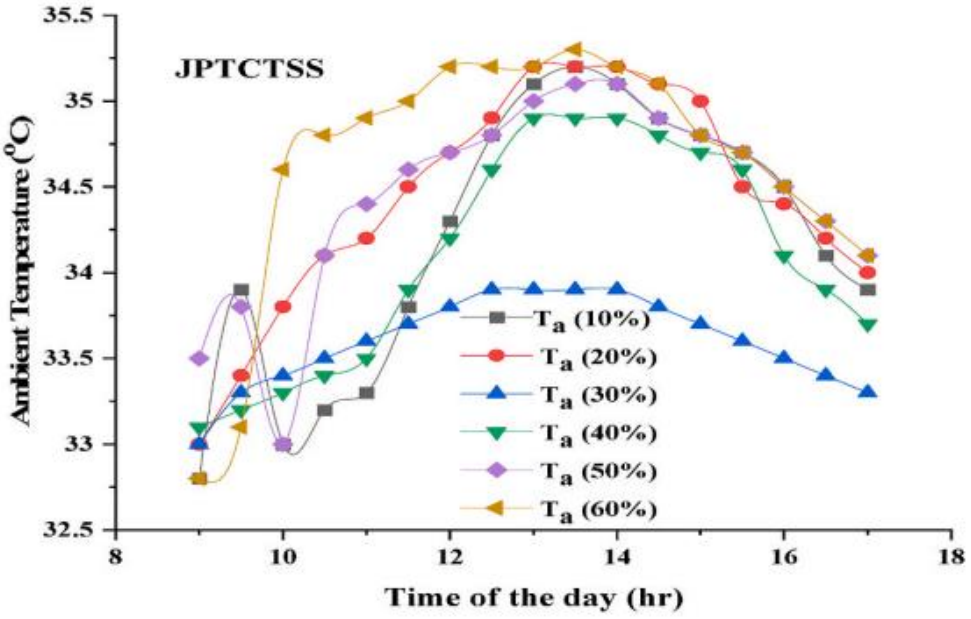

Fig-5. Ambient temperature

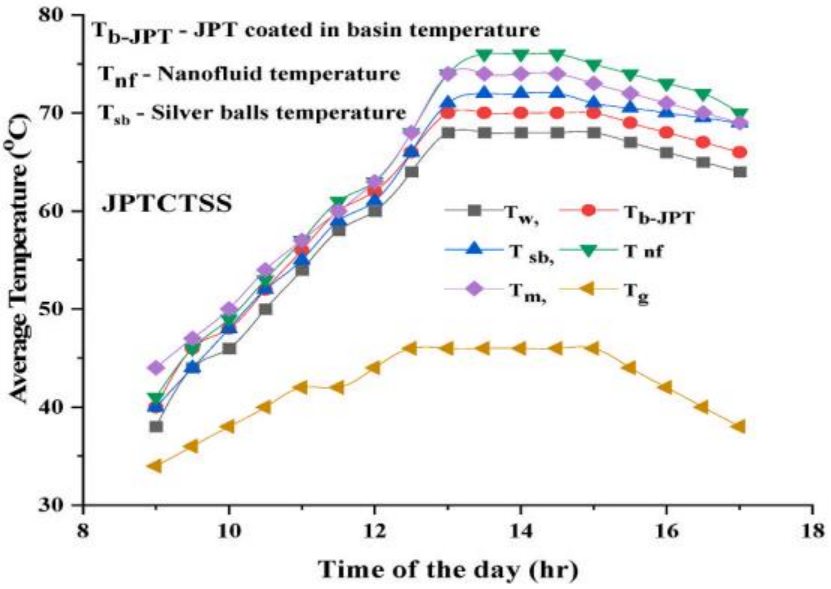

Fig-6. Average temperature

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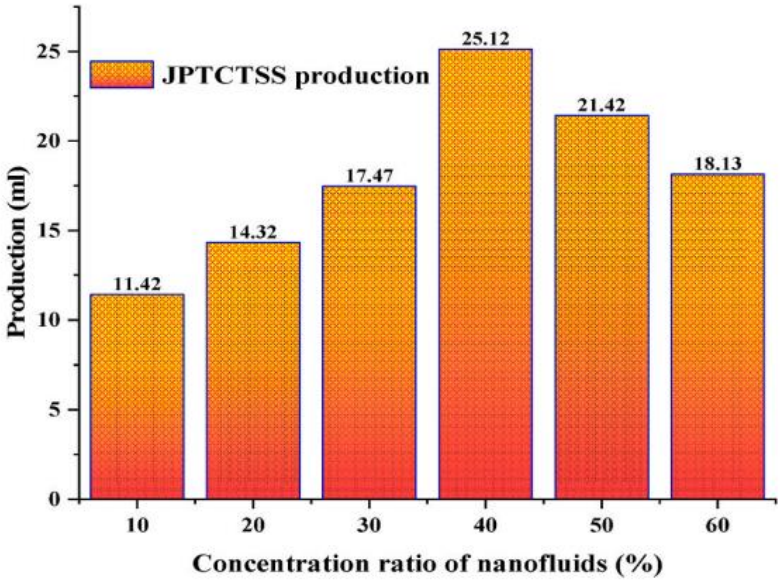

Fig- 7 The Production percentage

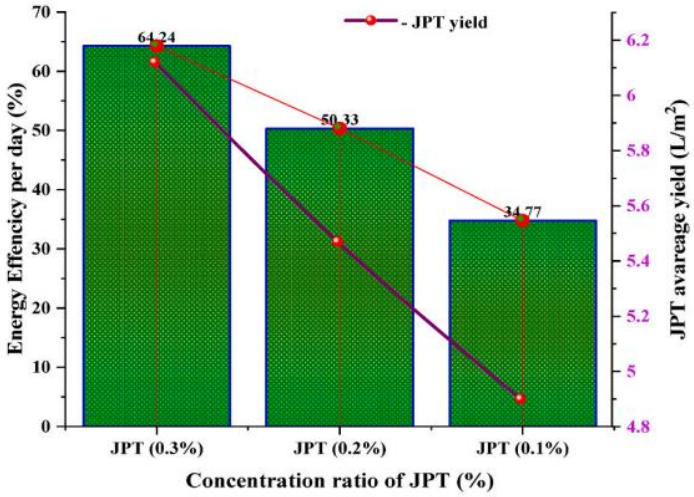

Fig- 8. Energy efficiency and average yield

Conclusion

Proposed work explained the coating with TJP and with concentration of 0.3% and hybrid nanofluid with 40% reached the efficiency upto 25.12% compared to the conventional solar stills. The excellent absorption is attaned by the jackfruit peels at 0.3%. Verified in the climatic condition of Koneru Lakshmaiah Education Foundation at Vijayawada. SEM explains the 295 nm formed in the spherical shape size upto 40–60 nm.

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