



Improving a conventional greenhouse solar still using sun tracking system to increase clean water yield

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ABSTRACT

In this paper the performance of active sustainable solar still was studied. A conventional greenhouse solar still coupled with a flat-plate solar collector and photovoltaic (PV) system was built and tested. The sun tracking system was designed for the solar collector to track the sun position and to heat up the water flowing through the collector. This helps to further increase the water temperature in solar still basin and increase the daily yield of distilled water. The system consists of a solar still, a flat-plate collector, and a PV module to provide power supply to all the electrical components in the control system. Two-axis tracking was built to control the direction of the solar collector. The system was tested in Kuching (01°33' N, 110°25' E), (Sarawak, Malaysia) in different weather conditions. The obtained results show that there is a significant growth in the experimental thermal efficiency of the active solar still with sun-tracking (38.55%) as compared to the passive one (22.70%). Its efficiency is even higher as compared to active the non-sun-tracking solar stills (34.70%). This proves that solar collector with sun-tracking can indeed improve the performance of a solar still. In addition there is a small increase of 3.98% in the still efficiency for active solar still with sun-tracking (38.55%) as compared to the non-sun-tracking (34.70%). Comparisons between theoretical and experimental results are also presented.

Keywords: Solar Still; Desalination; Solar collector; Sun-tracking system; Photovoltaic cell; Water yield

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