



Performance improvement of solar still using phosphate granules as energy storing materials: an experimental study

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ABSTRACT

There are many technologies that use solar energy to increase distilled water from salty water, using solar distillation. This article examines the performance improvement of solar still using phosphate granules with dimensions of 1.5–2 mm. All phosphate constituents have a high thermal conductivity, and this leads to the collection of thermal energy in solar utilization. In order to increase the yield in this experiment, modifications are made to traditional solar still using phosphate granules of 1%–2% (10–20 g/L) of varying concentration. The inclusion of phosphate granules enhanced the evaporation and condensation amounts as well as the daily yield. The total drinkable water production from the conventional solar distiller (CSD) and modified solar distillers with 1% and 2% of phosphate granules (MSDPG-1% and MSDPG-2%) are 3.5, 4.3 and 4.9 kg/m², respectively. Linked to the CSD, the daily drinkable water production was increased by 22.85%, 40% when using MSD with phosphate granules at a concentration of 1% and 2%, respectively.

Keywords: Conventional solar still; Phosphate granules; Energy storage; Desalination; Sustainable production

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