Investigation of the factors influencing the efficiency of a solar still combined with a solar collector

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ABSTRACT

A solar still was designed for the evaporation of desalination brine. The influence of several factors, such as the basin heating, the material of the cover (glass or polycarbonate), the existence of a mirror, the activation of an air extractor, and the existence of a black painted floor in the solar still, was evaluated in terms of their contribution to brine evaporation. The experiments were conducted with a factorial design approach. The combination of the factors that produced the best results was used in a subsequent daily monitoring study for brine evaporation. The monitoring parameters were the hourly average incident radiation, the changes in the temperature, the brine mass, and the brine volume. The accumulated amounts of the solar energy were calculated, and the correlation relationship was assessed.

Keywords: Basin heating; Factorial design; Solar radiation; Air extractor; Mirror

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