

Modeling and simulation in dynamic mode of a triple effect desalination system coupled to a plane solar collector

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ABSTRACT

In traditional solar desalination stills, operating by phase change, a profitability problem exists, because the quantity of produced fresh water is rather small (3–4 liters per day per square meter of collecting surface). This article gives an account, via numerical simulation, of the time evolution of the various parameters and variables characterizing a triple effect system functioning on solar energy. It also gives an idea of the evolution of produced fresh water, brine discharge, and feed flowrate, and thus highlights the improvement of the daily water production per square meter. This simulation also shows the influence of the presence of salt on the thermodynamic characteristics of salt water solutions. Finally, a system of regulation of feed flowrates makes it possible to control salinity and thus to avoid the filling of salt into components of the installation like heat exchangers. The modelling of the system presented in this study, is based on the conservation equations of mass and energy for the various components.

Keywords: Solar desalination; Thermodynamics; Dynamical mode; Multiple effects

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