

Effect of the Distance Between the Cold Surface and the Hot Surface on the Production of a Simple Solar Still

Authors : Hiba Akrouf, Khaoula Hidouri, Béchir Chaouachi, Romdhane Ben Slama

Abstract : A simple solar distiller has been constructed in order to desalt water via the solar distillation process. An experimental study has been conducted in June. The aim of this work is to study the effect of the distance between the cold condensing surface and the hot steam generation surface in order to optimize the geometric characteristics of a simple solar still. To do this, we have developed a mathematical model based on thermal and mass equations system. Subsequently, the equations system resolution has been made through a program developed on MATLAB software, which allowed us to evaluate the production of this system as a function of the distance separating the two surfaces. In addition, this model allowed us to determine the evolution of the humid air temperature inside the solar still as well as the humidity ratio profile all over the day. Simulations results show that the solar distiller production, as well as the humid air temperature, are proportional to the global solar radiation. It was also found that the air humidity ratio inside the solar still has a similar evolution of that of solar radiation. Moreover, the solar distiller average height augmentation, for constant water depth, induces the diminution of the production. However, increasing the water depth for a fixed average height of solar distiller reduces the production.

Keywords : distillation, solar energy, heat transfer, mass transfer, average height

Conference Title : ICDRE 2020 : International Conference on Desalination and Renewable Energy

Conference Location : Paris, France

Conference Dates : January 23-24, 2020