

Simulation of the solar still under real operating conditions

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ABSTRACT

The present work is a contribution to reduce water deficiency in my country by using the solar distillation means. We propose a model of solar still planted under climatic conditions of the area of Constantine located at Eastern of Algeria. A theoretical approach is used to simulate the behavior of some internal and external parameters related to the solar-still with time, and their effects on the system performance during a sunny period. These parameters include the temperature difference between the evaporation surface and that of the condensation, internal heat transfer, water depth, wind velocity, solar radiation, ambient temperature, and external heat transfer. The obtained results show that the productivity is strongly related the solar radiation in the best direction of the still and a large temperature difference between the glass and the water surface improves the daily production. Moreover, shallow water of 0.02 m in basin of still gives higher production. Daily yield of still increases as wind speed increases up to critical value at 10 m/s where production reaches its maximum. The still productivity has increased by 57, 71% when the wind velocity increases from 2 to 10 m/s. The internal and the external heat transfers affect directly the performance of the still in relation with solar radiation.

Keywords: Solar still; Internal parameters; External parameters; Performance

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