Faculty of Engineering- Fayoum University

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كلية الهندسة- جامعة الفيوم

قسم الهندسة الميكانيكية

ملخص البحث باللغة الإنجليزية:

" Experimental Study on a Modified Solar Power Driven Hybrid Desalination System "

This paper offers a study on a modified solar power driven hybrid desalination system (SS-HDH). SS-HDH system consisting of a solar still (SS) and air humidification dehumidification (HDH) unit integrated with solar air-water heater. This study is implemented experimentally under the real daytime starting at 8:00 AM until 6:00 PM. The variations on the SS-HDH system performance and productivity, according to the different operating conditions were studied. The proposed hybridization method between HDH and SS units has led to a significant effect on the performance and productivity of both of them. The maximum productivity of the system reached to 18.25 l/m2 day at mass flow rates of air and water equal 0.03 kg/s. The humidification efficiency reached about 79% and affected by increment on water mass flow rate more than the increment on the air mass flow rate. The system overall efficiency varies from 21% to 39%. The SS-HDH system performance influenced strongly by air mass flow rate. Gain output ratio (GOR) of about 2.57. Moreover, the smallest distilled water cost of 0.0081 US $/liter is achieved with the case of productivity equal 18.25 l/m2 day. The uncertainty in calculating of performance parameters was about 5.68–7.8%.