Thermal modeling and carbon credit earned of a double slope passive solar still

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ABSTRACT

In this article an attempt has been made to develop thermal model of double slope passive solar still on the basis of energy balance of east and west condensing covers, water mass and basin liner. Analytical expressions for water temperature, inner and outer condensing covers temperature and distillate yield have been derived as a function of climatic and design parameters. Experimental validations have been carried out by using heat and mass transfer relation given by Dunkle. It is observed that there is a good correlation between theoretical and experimental results with correlation coefficient varies from 0.6958 to 0.9867. The monthly data of yield of double slope passive solar still has been used to evaluate CO_2 emission, mitigation and carbon credit earned for different water depth and life of the system on the basis of energy and exergy.

Keywords: Solar distillation; Thermal modeling; Heat and mass transfer; CO_2 emission

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