The effect of cover tilt angle of a double slope solar still on the productivity in summer and winter seasons

Trad Abderachid*, Kaabi Abdenacer

Laboratory of Environmental Engineering, University of Constantine 3, Algeria, Tel. +213 0 776 08 22 42; Fax: +213 0 32567372; email: rachidtrade@yahoo.com (T. Abderachid), Tel. +213 0 772 95 51 49; Fax: +213 0 32567372; email: kaabiabdenacer@yahoo.co.uk (K. Abdenacer)

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ABSTRACT

Algeria is interested in using solar still in order to produce distilled water from brackish water, since the climate is characterized by a high solar radiation during almost all the season. In this study, a computer program is set up in order to simulate the effect of the cover tilt angle on the performance of a double slope solar still under climatic conditions of the area of Constantine (northeast of Algeria), using meteorological data recorded during the last decade (2002–2012). 1 August 2005 and 28 February 2010 are selected as successively the hottest days for, respectively, summer and winter seasons. The obtained results show that 10˚ and 45˚ represent the optimum angles of inclination allowing to receive a maximum solar radiation for this type of solar still during the considered seasons, by increasing the evaporation–condensation phenomenon. However, in the summer season, a tilt of 10˚ gives a higher daily productivity compared to that of 45˚ with an increase of the productivity of about 24.45%. In contrast, in the winter season, a tilt of 45˚ gives higher daily productivity compared to that of 10˚ with an increase of the productivity of about 34.28%. Therefore, the tilt angle is an important factor to be considered for a solar still design. A water (brine) depth of 0.02 m gives higher daily productivity at optimum angles of the still.

Keywords: Solar still; Tilt angle; Performance

*Corresponding author.

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