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# Sustainable potable water production from conventional solar still during the winter season at Algerian dry areas: energy and exergy analysis

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## Abstract

The Algeria Sahara suffers from the scarcity of drinking water. Solar distillation is one of the simplest and generally inexpensive techniques to

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nanoparticles in winter is 3 kg/m<sup>2</sup> per day. The productivity of the conventional solar still without CuO nanoparticles in summer is best as compared to others. When comparing productivity during the winter season, it is found that the productivity of the modified distillery was 1.4 times better than the productivity of the unmodified distillery. The daily exergy efficiency of the conventional solar still in summer and winter is equal to 1.2 and 1.58%, respectively. The use of CuO nanoparticles in winter season has exergy efficiency equal to 2.41%. The daily exergy efficiency of the solar still was increased by 52.5% when using CuO nanoparticles in the winter season.

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## Abbreviations

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**CSSS:** Conventional solar still in summer

**CSSW:** Conventional solar still in winter

**MSSW:** Modified solar still in winter

**PCM:** Phase change materials

**TSS:** Tubular solar still

**$I(t)$ :** Solar intensity

**$T_a$ :** Air temperature

**$T_{s,w}$ :** Salt water temperature

**$T_{c,c}$ :** Collector cover temperature

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