Solar energy storage sucre

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Economic analysis was carried out to analyze the payback period, the selling price of distilled water, and the cost of water produced from the conical solar distiller.

The experiments are conducted over a duration of two days. On the first day, the first distiller does not have any energy storage material, while the second distiller"s basin is filled with glass balls, and the third distiller"s basin is filled with stainless steel balls. On the second day, the first distiller is devoid of any energy storage material. The second basin of the distiller is filled with sandstones, whilst the third tank of the distiller is filled with black gravel. The ponds contain brine at a depth of 1.5 cm.

This technique is used to speed up the evaporation process by increasing the surface area of water exposed to the solar irradiation. Figure 1 shows the schematic diagram of a conventional conical solar distiller with energy storage materials.

A photo of different energy storage materials of same size of 1.50 cm are presented in Fig. 2a-d. Table 1 presents the properties of utilized glass balls (GB), stainless steel balls (SSB), sand stones (SS), and black gravel (BG).

In summary, the thermal conductivity of these materials varies depending on their material composition and structure. Stainless steel balls have the highest thermal conductivity, followed by glass balls, sandstone, and black gravel, which have the lowest thermal conductivity.

As different energy storage materials with low cost (glass balls (GB), stainless steel balls (SSB), sand stones (SS), and black gravel (BG) with equal sizes (1.5 cm)) is an excellent sensible heat storage. Figure 3 shows photograph of a basin solar still with different energy storage materials.

The temperatures of the water, glass, and basin, among other parts of a solar still, may be precisely measured to within ? 0.1 ?C using a K-type thermocouple. A solar power meter, which measures environmental factors including solar intensity, can measure values between zero and 1999 W/m2.

An accuracy of ? 10 W/m2 is provided by the solar power meter. The amount of water collected at hourly intervals is measured with an accuracy of ? 1 ml using digital weighing equipment.

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This approach, which can be used for any system analyzed from a thermal standpoint, entails comparing the energy consumed, namely in the form of desalinated water, to the energy input into the system, in the form of heat energy derived from solar irradiation55.

The exergy of a system is the maximum potential work that may be obtained from it when it is in a state of balance with its surroundings. Because exergy violates the principles of thermodynamics, the equation for system balance can be stated as19:

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