

Solar medical sterilizer using pressure cooker for rural off-grid areas (Conference Paper)

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Abstract

To design and develop a prototype, solar medical steam sterilizer for use in remote areas around the world. A paraboloidal dish-type concentrator was used as a collector and a pressure cooker was used as a receiver/absorber. The concentrator and receiver (C–R) system was used as a medical sterilizer. To increase the reflectance of the concentrator, aluminum foil was used as cover to reflect the solar radiation on to the bottom of the pressure cooker. The bottom of the pressure cooker was coated by normal black body. The pressure cooker gained temperature and pressure. A thermocouple was used to measure the temperature, and pressure gauge was used

to measure the pressure, respectively. The solar beam radiation was measured by pyrheliometer. The required temperature was 121 °C, and the pressure was 1.05 kg/cm² which were obtained, and those were measured by thermocouple and pressure gauze, respectively. When the obtained temperature 121 °C and pressure 1.05 kg/cm² was kept for 15 min mixed with medical instruments and water, and then it was tested at ICDDR and BCSIR at Dhaka, Bangladesh and shown that these medical instruments were sterilized properly. The cost of the whole system was around 90 USD. It has been used as a paraboloidal dish-type concentrator, a pressure cooker, and medical instruments mixed with water which makes a solar steam medical sterilizer. © The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd 2020.

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