ABSTRACT
A solar distillation system was built and tested to study the effect of increasing the solar radiation incident on a roof-type still, which was also augmented with a flat-plate collector. The modification was performed by adding a reflective surface to a structure that was already used to carry the hot and cold water tanks which were parts of the solar water heating system. The reflective surface was designed to reflect mid-day solar radiation on a single stage, basin type solar still connected to the conventional flat-plate collector system. The surface was fixed on one side of the water tank, and the relative position of the tank and the still has been modified to maximize the radiation reflected by the reflecting surface on the surface of the still. Measurements of various temperatures, solar intensity, and distilled water produced were performed for various days at various operational conditions. The performance of the modified system was investigated and compared with the performance of two other modes of operation: still operating alone and still connected to collector. It was found that the addition of the reflective surface has a net positive effect on the distilled water production, which improved the performance of the system. The productivity of the still augmented with the reflector in addition to the collector was increased to about 212%. In a clear sky day it exceeded 5.5 liters/m². When the still was augmented only with the collector, the increase was about 168%. The increase due the reflector with respect to the collector alone was about 126%. 

A SOLAR STILL AUGMENTED WITH A FLAT-PLATE COLLECTOR AND A REFLECTOR

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