



PV cell-driven humidification-dehumidification (H/D) process for brine treatment

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ABSTRACT

This study was to technically evaluate a solar still desalination system driven by photovoltaic (PV) cells for treatment of a brine wastewater through evaporation (humidification) and subsequent condensation (dehumidification) processes. Based on the solar radiation data in Shanghai, China, solar energy utilization, freshwater production, and salt production were estimated. Results showed that under the identical operating conditions, air forced convection ($5.9 \text{ m}\cdot\text{s}^{-1}$) exhibited a better performance than free convection with the regards toward air humidification and freshwater productions. However, free convection had much higher energy recovery. Our study demonstrated that the new solar still, powered directly and indirectly by solar energy, is an effective and economic desalination process, and it may be very useful in rural communities.

Key words: Solar stills; Brine; Desalination; Humidification; Dehumidification

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