



## **Performance of a solar reactor for anaerobic wastewater treatment under different climatic conditions**

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A solar heated reactor system was designed to enhance the anaerobic treatment of wastewater or biological sludge at temperatures higher than the ambient air temperature. Solar energy absorbed by flat plate collectors is transferred to a heat storage tank, which continuously supplies an anaerobic-filter reactor with water at a maximum temperature of 35 °C. The packed reactor is a metallic cylindrical tank with a peripheral twin-wall enclosure. Inside this enclosure is circulated warm water from the heat storage tank. The size of the solar energy system is designed so that the useful energy gain meets all heating needs throughout the year. Furthermore, a mathematical model was developed for the prediction of the temperature distribution within the reactor under steady state conditions. Preliminary results based on model simulations performed with meteorological data from various geographical regions of the world with different climatic conditions suggest that the proposed solar reactor system is a promising and environmentally friendly approach for the anaerobic treatment of wastewater and biological sludge.