EFFICACY OF A SMALL-SCALE SOLAR STILL IN DISINFECTING ADENOVIRUS AND THERMOTOLERANT COLIFORMS IN WATER FOR HUMAN CONSUMPTION

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Solar water distillation is currently being used in many developing countries. Nevertheless, this process is limited by the small water volume produced and economic viability of the treatment. Yet, little is known about the efficacy of the solar disinfection treatment. For this research, a small-scale solar still was built in order to assess the equipment's efficiency in disinfecting contaminated waters, besides studying the production capacity and economic viability of the technique. The production capacity was assessed during the day and night and the parameters with greatest influence, i.e., of solar radiation, water temperature, and environment temperature in South region of Brazil were verified. The system's disinfection efficiency was assessed through the rates of elimination and/or destruction of total coliforms and *Escherichia coli* and through the number of DNA copies of human adenovirus type 5 (HAdV-5). Samples evaluated came from rain water collected from the roof of a rural property in the city of Taquara, RS, Brazil, and from a tributary stream of Arroio Muller collected in the same property, as well as from artificially contaminated water which was used as a control. The results showed that water production is highly impacted by solar irradiation and that the equipment is able to provide up to 4.2 L/m^2/day at a cost of approximately BRL 0.06/L (USD 0.02/L). Moreover, the samples subjected to solar disinfection had 100% removal of total coliforms and *Escherichia coli* and 4.5 log (99.997%) inactivation of HAdV-5 when compared to the samples that did not undergo solar disinfection. Finally, the water treated by the system was within the microbiological potability parameters mandated by the international guides USEPA and HEALTH CANADA.

Keywords: Solar still, Water disinfection, Virus, Coliforms.

Agência de Fomento:

CNPq, FAPERGS e FUNASA