

## **Designing a water purification system using solar energy as primary energy source to improve the drinking water quality in faculty of technology**

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### **Abstract**

Drinking water is essential to living beings. Access to safe and clean drinking water is necessity for good health. Water used for drinking at the Faculty of Technology, University of Ruhuna has some problems. The objective of this study is to evaluate the quality of drinking water and propose a technique for its purification. According to analytical test results, drinking water provided does not satisfy all physicochemical standards. Drinking water at the faculty is primarily turbid and hard. Boiling is the only non-chemical approach to remove hardness and turbidity. One method for water purification that can be used to disinfect water is distillation. Heat energy is needed for such a process, and use of solar energy is an eco-friendly method to be used. Purified water is obtained by utilizing a solar evacuated tube coupled with a parabolic trough solar collector, where water is heated and evaporated. Water pasteurization system has been designed, constructed, and tested. After analyzing parameters of water samples, both before and after treatment, it was found that the quality and amount of purified or distilled water from the solar evacuated tube combined with the parabolic trough solar collector is significantly higher compared to other conventional solar stills. The efficiency of the system at sunny days and cloudy days were 90% and 50%, respectively. The developed system is an effective and a sustainable system for water purification.

**Keywords:** *Distillation, Parabolic trough solar collector, Water pasteurization*