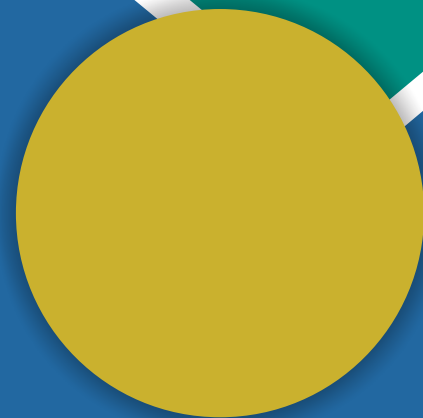


Solar Desalination of Water Using Evaporation Condensation and Heat Recovery Method



Abdul Ghafoor and Azlan Zahid

Department of Farm Machinery and Power,
University Agriculture, Faisalabad



About 1.1-1.5 billion people in the world lack access to good quality drinking water. A serious situation prevails in Africa and Asia, where about 50% of the population do not have access to potable water. According to WHO, the harmful diseases produced from unsafe water supply, poor sanitation and hygiene causes about 1.8 million deaths annually in the world in order to produce 1000 m³ desalinated fresh water on daily basis involves 10,000 tons of oil per year. more than

14,000 desalination plants are in operation worldwide with gross capacity of billion liters of water per day. These desalination plants running with fossil fuels are becoming expensive and are also harmful to the environment due to harmful emissions. The fresh water demand can be fulfilled if abundantly available saline sea water is converted to potable water using solar thermal energy for desalination process. A simple, low cost and easy to operate novel single stage integrated solar desalination system has been developed based on evaporation condensation and heat recovery method for domestic purpose in remote areas of the country where fresh water is not available or very costly.

Process Description and Results

Water in EC is converted to vapors by heat of hot water circulating through Flat Plate Collector (FPC) and Evaporation Chamber (EC). The heat of vapors is recovered in Condensation Chamber (CC); vapor releases its heat to the water in CC. The system works at atmospheric pressure. The distillate productivity can reach up to 2.7 L/m²/d and exhibits good results having EC_w 0.18 ds/m, pH 6.1, TDS 127 ppm, Na⁺, Ca²⁺ and Mg²⁺ 0.53, 0.78 and 0.61 mg/L, respectively.

Impact

The indigenization of solar thermal desalination technology will encourage the poor community to adopt this technology in order to get rid of primary energy sources and their contribution toward cleaner environment.

