Preliminary investigations on an air-cooled based low temperature flash evaporation desalination system for small-scale applications

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ABSTRACT

This paper deals with the use of an air-cooled condenser in a low-temperature flash evaporation desalination system, suitable for small-scale applications. A small-scale desalination system has been designed to operate at an evaporator pressure of 0.2 bar and the performance of the system is evaluated for different inlet feed water temperatures between 70 and 90°C and at varying flow rates using three different nozzles. It is seen that the yield of the system depends on the temperature of inlet water, nozzle diameter and flow rate. A maximum yield ratio of 2.3% is obtained at an inlet water temperature of 90°C and at a feed water flow rate of 200 ml/min. The quality of the condensed distillate is found to be within the safe standards of drinking water making this system a feasible and viable option to meet the small-scale freshwater needs in rural and coastal areas.

Keywords: Air-cooled; Flash evaporation desalination; Low temperature; Vacuum desalination