

Assessment of distillate water quality parameters produced by solar still for potable usage

ABSTRACT

In this study, a few field experiments were conducted on a simple solar still and water quality analyses were done in laboratory to check the contaminants removal efficiency from raw water samples. A few water quality parameters such as pH, redox, electrical conductivity (EC), salinity, total dissolved solids (TDS), Escherichia coli and arsenic for the feed (before distillation) and product water (after distillation by a solar still) were obtained. A wide range of water samples (e.g. seawater, pond water, and arsenic contaminated groundwater) were collected from various locations in Malaysia and Bangladesh. A few synthetic saline water samples (e.g. 1, 2, 3 and 5% salt) were also prepared. The values of pH (6.5-7.5), redox (100-200 mV), EC (< 750 mS/cm) of the product water were found within the standard ranges. The average removal efficiencies of more than 24 and 99% were obtained from repetitive tests run on salinity and arsenic, respectively. The still was also successful in removing pathogenic bacteria by more than 80%. These obtained parameters of the product water were then compared with various drinking water standards and found that most of the values obtained were within the acceptable ranges provided by the standards. Finally, it is concluded that the solar still is able to produce potable water and can be installed to remove the water scarcity in coastal and arid regions.

Keyword: Water quality; Distillate quality; Desalination; Solar distillation; Water purification; Solar still