

Development of seawater distiller that uses electrical energy for sustainable clean water production

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Abstrak

This study aims to develop a seawater distiller that can be used to purify water by using electrical energy to power the heating elements used in the condensation phase of distillation. Varying numbers of water heating elements and water levels in the evaporator unit were analyzed to determine the ideal device configuration. The distillation device consisted of a container unit, a water level control unit, and an evaporation chamber unit. Distillation was conducted in two experiments, one with a water level of 8 cm and the other, 4 cm, in the evaporation unit. Each experiment comprised eight tests, in which 1–6 water heating elements were used in various configurations; identical configurations were used in both experiments. The seawater used was obtained from the Indian Ocean off Balekambang Beach, Malang Regency, Indonesia. The largest purified water volume obtained among the 16 experimental conditions was 3.94 L at a cost of IDR 790 per liter. The effectiveness percentage toward water quality improvement in terms of pH, electrical conductivity, TDS, and maximum salinity was 9.88%, 99.98%, 99.96%, and 100%, respectively. In the future, a full-scale experiment will be conducted on site. The use of this device will therefore benefit people in areas with water scarcity.