

ABSTRACT

Fresh water is a basic human need and crucial for daily life. However, in coastal areas, seawater and freshwater often mix, making the water unsuitable for daily use. Therefore, this research aims to design a device that can convert seawater into freshwater, or a desalination device.

The desalination device will operate automatically using the reverse osmosis desalination method. This device is equipped with several sensors, including water level, TDS, pH, temperature, and turbidity sensors, as well as actuators such as relays, water pumps, and high-pressure water pumps. To ensure the device's automatic operation, a microcontroller is required. Indicators such as an LCD, LED, and buzzer provide real-time monitoring of water status and quality.

Each sensor is calibrated and tested to ensure it meets the specified standards. The device was tested 30 times, successfully converting seawater into freshwater, meeting the required standards and quality. The test showed that seawater with an average dissolved solid content of 1296.03 ppm was converted into freshwater with a dissolved solid content of 99.9 ppm. This meets the standard for freshwater with a dissolved solid content of <500 ppm. If 5 liters of seawater are added, the average yield is 1.17 liters of freshwater and 3.43 liters of wastewater. The desalination device can produce 22.4% freshwater per 5 liters of water. This demonstrates that the desalination device can convert seawater into freshwater with good water quality.

Keywords: Sea water, Fresh water, Desalination, Automatic, Reverse Osmosis.