

ABSTRACT

The optimal control of water quality in Vannamei shrimp (Litopenaeus vannamei) farming ponds is a critical challenge in enhancing productivity and sustainability. This research develops an automatic control system based on the Internet of Things (IoT) powered by renewable solar energy. The system monitors water quality parameters, such as ammonia levels, pH, and turbidity, in real-time using various sensors connected to an ESP32 microcontroller. The data collected is utilized to automatically control aerators and water pumps to maintain optimal pond conditions. The results are expected to assist shrimp farmers in improving operational efficiency, reducing disease risks, and supporting data-driven decision-making sustainably. Thus, this innovation offers an energy-efficient, environmentally friendly, and effective solution for managing Vannamei shrimp farming ponds.

Keywords: Water quality control, Vannamei shrimp, Internet of Things (IoT), Solar panels, Ammonia, pH, Turbidity, Automated system.