ABSTRAK

RANCANG BANGUN ALAT *MONITORING* KUALITAS AIR PADA BUDIDAYA IKAN AIR TAWAR DENGAN SENSOR *OXIDATION-REDUCTION POTENTIAL* (ORP) DAN SENSOR *TOTAL DISSOLVED SOLIDS* (TDS) BERBASIS *INTERNET OF THINGS* (IoT)

(Nasya Putri Dini 2025: 32 Halaman)

Budidaya ikan air tawar memerlukan kualitas air yang optimal untuk mendukung pertumbuhan dan kesehatan ikan. Penurunan kualitas air dapat menyebabkan stres, penyakit, bahkan kematian pada ikan. Penelitian ini bertujuan merancang dan membangun alat monitoring kualitas air berbasis Internet of Things (IoT) untuk membantu pembudidaya memantau parameter penting air secara real-time. Alat yang dikembangkan menggunakan mikrokontroler ESP32 dan dua sensor utama, yaitu sensor *Oxidation-Reduction Potential* (ORP) dan *Total Dissolved Solids* (TDS), yang berfungsi mendeteksi tingkat oksidasi-reduksi dan jumlah zat terlarut dalam air. Data yang diperoleh dikirim ke aplikasi mobile Blynk melalui jaringan Wi-Fi, sehingga pengguna dapat memantau kondisi air dari jarak jauh. Hasil pengujian menunjukkan alat mampu mengukur parameter TDS dengan tingkat akurasi 99,13% dan ORP dengan akurasi 99,29% setelah kalibrasi terhadap alat laboratorium. Uji kinerja pada tiga jenis perairan (air sungai, rawa, dan lumpur) menunjukkan bahwa air sungai memiliki parameter yang paling mendekati standar kualitas air untuk budidaya ikan air tawar.

Kata Kunci: *Internet of Things*, kualitas air, budidaya ikan, sensor ORP, sensor TDS, ESP32.

ABSTRACT

DESIGN AND DEVELOPMENT OF AN WATER QUALITY MONITORING DEVICE FOR FRESHWATER FISH FARMING USING OXIDATION REDUCTION POTENTIAL (ORP) AND TOTAL DISSOLVED SOLIDS (TDS) SENSORS BASED ON THE INTERNET OF THINGS (IoT)

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Freshwater fish farming requires optimal water quality to support the growth and health of fish. Poor water quality can lead to stress, disease, and even fish mortality. This study aims to design and develop a water quality monitoring device based on the Internet of Things (IoT) to assist fish farmers in monitoring key water parameters in real-time. The system uses an ESP32 microcontroller and two main sensors: the Oxidation-Reduction Potential (ORP) sensor and the Total Dissolved Solids (TDS) sensor, which function to detect the oxidation-reduction level and the amount of dissolved solids in the water. Data collected by the system is transmitted via Wi-Fi to the Blynk mobile application, enabling users to monitor water conditions remotely. Test results show that the device achieves 99.13% accuracy for TDS measurements and 99.29% accuracy for ORP measurements after calibration with laboratory instruments. Performance tests in three types of water (river, swamp, and muddy water) indicate that river water has parameters closest to the standard quality for freshwater fish farming. Therefore, this device is effective for practical and real-time water quality monitoring in freshwater aquaculture.

Keywords**:** *Internet of Things, water quality, aquaculture, ORP sensor, TDS sensor, ESP32*