ABSTRAK

RANCANG BANGUN ALAT PENDETEKSI KLORIN PADA RENDAMAN AIR BERAS BERBASIS ESP 32 DENGAN SENSOR TDS DAN TCS3200

(Chiara Deswita Guslin 2025:75)

Keamanan pangan merupakan faktor penting dalam menjaga kualitas dan kesehatan makanan yang dikonsumsi masyarakat. Untuk meningkatkan pemahaman mengenai isu penggunaan bahan tambahan ilegal, seperti klorin pada beras, diperlukan alat deteksi yang sederhana, akurat, dan mudah dioperasikan sebagai media edukasi. Penelitian ini mengembangkan alat pendeteksi klorin berbasis mikrokontroler ESP32 dengan sensor warna TCS3200 dan sensor TDS (Total Dissolved Solids) meter untuk mendeteksi perubahan warna akibat reaksi klorin dengan reagen DPD serta mengukur tingkat kontaminasi zat terlarut. Pengujian alat dilakukan pada sepuluh sampel air rendaman beras yang divalidasi oleh laboratorium Kimia Politeknik Negeri Sriwijaya, dengan hasil yang menunjukkan efektivitas deteksi klorin secara akurat. Selain berfungsi sebagai alat deteksi, perangkat ini dirancang sebagai sarana edukasi bagi siswa di SMA IT Izzatuna Palembang. Dengan biaya produksi terjangkau dan antarmuka yang user- friendly, alat ini mendukung pembelajaran praktis mengenai keamanan pangan dan dampak penggunaan bahan tambahan ilegal, Sehingga secara efektif meningkatkan kesadaran dan pemahaman siswa melalui metode pembelajaran yang aktif dan berbasis praktik, mendorong keterlibatan langsung serta pengaplikasian pengetahuan keamanan pangan dalam kehidupan sehari-hari secara nyata dan berkelanjutan.

Kata Kunci: Klorin, Keamanan Pangan, ESP32, Sensor TCS3200, Sensor TDS, Edukasi, Air Rendaman Beras, Reagen DPD, Deteksi Warna

ABSTRACT

DESIGN AND DEVELOPMENT OF A CHLORINE DETECTION DEVICE IN RICE SOAKING WATER BASED ON ESP32 USING TDS AND TCS320 SENSORS

(Chiara Deswita Guslin 2025:75)

Food safety is a crucial factor in maintaining the quality and healthiness of food consumed by the public. To enhance understanding of the issue regarding the use of illegal additives such as chlorine in rice, a detection device that is simple, accurate, and easy to operate as an educational tool is required. This study develops a chlorine detection device based on the ESP32 microcontroller, using a TCS3200 color sensor and a Total Dissolved Solids (TDS) sensor to detect color changes resulting from the reaction between chlorine and DPD reagent as well as to measure dissolved solids contamination levels. Device testing was conducted on ten samples of rice soaking water, validated by the Chemistry Laboratory of Sriwijaya State Polytechnic, with results demonstrating effective and accurate chlorine detection. In addition to serving as a detection tool, this device is designed as an educational medium for students at SMA IT Izzatuna Palembang. With affordable production costs and a user-friendly interface, the device supports practical learning about food safety and the impact of illegal additives. Consequently, it effectively increases student awareness and understanding through active and practice-based learning methods, promoting direct engagement and the application of food safety knowledge in real-life and sustainable contexts.

Keywords: Chlorine, Food Safety, ESP32, TCS3200 Sensor, TDS Sensor, Education, Rice Soaking Water, DPD Reagent, Color Detection.