

ABSTRAK

RANCANG BANGUN ALAT *MONITORING SYSTEM* FERMENTASI TAPE UBI KAYU BERBASIS IOT (*INTERNET OF THINGS*)

(2025 : xiii + 71 Halaman + 41 Gambar + 18 Tabel + Daftar Pustaka + Lampiran)

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Proses fermentasi tape ubi kayu sangat dipengaruhi oleh kondisi lingkungan seperti suhu, kelembaban, dan kadar alkohol. Namun, metode konvensional yang digunakan oleh pengrajin tape seringkali mengabaikan faktor-faktor tersebut sehingga hasil produk menjadi tidak konsisten. Oleh karena itu, dirancanglah alat monitoring berbasis *Internet of Things* (IoT) yang dapat mengawasi proses fermentasi secara real-time.

Sistem ini menggunakan sensor DHT11 untuk memantau suhu dan kelembaban, serta sensor MQ-3 untuk mendeteksi kadar alkohol. Kedua sensor ini dikendalikan oleh mikrokontroler ESP32 yang terhubung ke aplikasi Telegram sebagai media pemantauan jarak jauh. Alat ini juga dilengkapi sistem kontrol otomatis berupa lampu pemanas dan kipas pendingin yang akan aktif berdasarkan hasil pembacaan sensor, serta buzzer sebagai indikator kadar alkohol mencapai ambang batas.

Hasil pengujian menunjukkan bahwa alat dapat menjaga suhu pada kisaran optimal 30°C dan memberikan notifikasi saat kadar alkohol mendekati 1% (10.000 ppm), yang menandakan kematangan tape. Dengan demikian, sistem ini dapat meningkatkan efisiensi dan kualitas produksi tape ubi kayu.

Kata kunci: Fermentasi, Tape Ubi kayu, Sensor DHT11, Sensor MQ-3, IoT (*Internet of Things*), Telegram, ESP32, Monitoring Otomatis

ABSTRACT

DESIGN AND DEVELOPMENT OF A FERMENTATION MONITORING SYSTEM FOR CASSAVA TAPE BASED ON IOT (INTERNET OF THINGS)

(2025 : xiii + 71 Pages + 41 Figures + 18 Tables + Bibliography + Appendix)

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The cassava tape fermentation process is highly influenced by environmental conditions such as temperature, humidity, and alcohol content. However, conventional methods used by tape producers often disregard these factors, leading to inconsistent product results. Therefore, an Internet of Things (IoT)-based monitoring device was designed to oversee the fermentation process in real-time.

This system uses a DHT11 sensor to monitor temperature and humidity, and an MQ-3 sensor to detect alcohol content. Both sensors are controlled by an ESP32 microcontroller connected to the Telegram application for remote monitoring. The device is also equipped with an automatic control system consisting of a heating lamp and a cooling fan that will activate based on sensor readings, as well as a buzzer to indicate when the alcohol content reaches a threshold.

Test results show that the device can maintain the temperature within the optimal range of 30°C and provide notifications when the alcohol content approaches 1% (10.000 ppm), indicating tape maturity. Thus, this system can improve the efficiency and quality of cassava tape production.

Keywords: *Fermentation, Cassava Tape, DHT11 Sensor, MQ-3 Sensor, IoT (Internet of Things), Telegram, ESP32, Automatic Monitoring*