

ABSTRAK

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RANCANG BANGUN INCUBATOR PLATELET AGITATOR DENGAN
MONITORING SUHU & KECEPATAN
BERBASIS KONTROL PID DILENGKAPI SAFETY ALARM
(SUHU)

i + 85 Halaman + 13 Tabel + 3 Lampiran

Penelitian ini bertujuan untuk merancang dan membangun alat *Incubator Platelet Agitator* dengan sistem monitoring suhu dan kecepatan berbasis kontrol PID serta dilengkapi *safety alarm*. Alat ini ditujukan untuk menjaga kualitas trombosit selama penyimpanan dengan mempertahankan suhu optimal antara 20–24°C dan gerakan agitasi konstan. Sensor PT100 digunakan untuk mendeteksi suhu dan data dikendalikan oleh mikrokontroler Arduino Uno. PID controller mengatur suhu menggunakan modul Peltier TEC1-12706 dan informasi suhu ditampilkan secara real-time melalui LCD. Fitur buzzer sebagai alarm keselamatan diaktifkan saat suhu di luar rentang yang ditentukan. Metode penelitian menggunakan pendekatan *pre-eksperimental* dengan desain *After Only Design*.

Hasil pengujian menunjukkan bahwa alat mampu bekerja secara efektif dan akurat, dengan nilai rata-rata standar deviasi 0.186, dan persentase error 1.936% yang menunjukkan konsistensi performa alat. Penelitian ini diharapkan dapat memberikan kontribusi nyata dalam penyediaan alat medis yang efisien, akurat, dan ekonomis, terutama dalam penanganan trombosit untuk kebutuhan hemostasis dan transfusi darah.

Kata kunci : *Incubator Platelet Agitator*, PID, PT100, Peltier, Monitoring Suhu, Arduino Uno, Alarm Suhu

Daftar bacaan : 20 buku

ABSTRACT

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PLATELET AGITATOR INCUBATOR DESIGN WITH TEMPERATURE AND SPEED MONITORING

BASED ON PID CONTROL EQUIPPED WITH SAFETY ALARM (TEMPERATURE)

i + 85 Pages + 13 Tables + 3 Appendices

This study aims to design and develop a Platelet Agitator Incubator equipped with a temperature and speed monitoring system based on PID control and a built-in safety alarm. The device is intended to maintain platelet quality during storage by preserving an optimal temperature range of 20–24 °C and consistent agitation. A PT100 sensor is used to detect temperature, which is processed by an Arduino Uno microcontroller. The PID control system manages the temperature through a Peltier TEC1-12706 module, and the real-time temperature data is displayed on an LCD screen. A buzzer alarm is activated when the temperature exceeds or falls below the predefined safe range. The research method applied is a pre-experimental approach using the After Only Design.

Test results indicate that the device operates effectively and accurately, supported by calculations of average value 0.186 standard deviation, and 1.936% error percentages which confirm the tool's consistent performance. This research is expected to contribute to the development of more efficient, accurate, and economical medical devices, particularly for platelet handling in hemostasis and transfusion applications.

Keywords : Platelet Agitator Incubator, PID Control, PT100, Peltier, Temperature Monitoring, Arduino Uno, Temperature Alarm

References : 20 books