

## **ABSTRAK**

### **RANCANG BANGUN DAN PENGUJIAN ALAT PERANGKAP NYAMUK OTOMATIS BERBASIS MIKROKONTROLER DENGAN SENSOR INFRAMERAH**

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Pengendalian nyamuk sangat diperlukan untuk mengatasi masalah penyakit yang disebabkan dan ditularkan melalui nyamuk, khususnya penyakit demam berdarah yang dapat membahayakan nyawa manusia. Penelitian yang dilaksanakan bertujuan untuk merancang alat untuk pembasmian nyamuk, mengetahui jumlah nyamuk yang terperangkap pada alat, dan melakukan pengujian alat yang meliputi keakurasian dan respon sistem, serta melakukan analisis data berupa koefisien determinasi ( $R^2$ ), koefisien korelasi ( $R$ ), dan *relative root mean square error*.

Penelitian ini dilaksanakan dengan perancangan desain alat, pembuatan alat, pengujian hasil rancangan, pengamatan dan analisis data. Pengujian alat dan analisis data meliputi keakurasian, respon sistem, koefisien determinasi ( $R^2$ ), koefisien korelasi ( $R$ ) dan *relative root mean square error*.

Hasil penelitian ini menunjukkan alat perangkap nyamuk otomatis yang berhasil dirancang dengan komponen utama yaitu Arduino, sensor inframerah, LED UV, *real time clock (RTC)*, dan *module micro SD card (MMC)*. Hasil jumlah nyamuk

yang didapatkan menggunakan alat ini yaitu sebanyak 259 ekor nyamuk datang, 203 ekor nyamuk masuk dan 184 ekor nyamuk mati selama 24 hari dengan rata-rata efektifitas penangkapan sebesar 63,74%, rerata waktu penangkapan sebesar 3,75 detik dan rerata waktu penjatuhan nyamuk sebesar 3,8 detik. Hasil uji kinerja pembacaan sensor nyamuk datang dan nyamuk masuk didapatkan nilai determinasi ( $R^2$ ) sebesar 0,8616, nilai koefisien korelasi (R) sebesar 0,9282 dan RRMSE sebesar 28,44%. Hasil uji kinerja pembacaan sensor nyamuk masuk dan nyamuk mati didapatkan nilai determinasi ( $R^2$ ) sebesar 0,9444, nilai koefisien korelasi (R) sebesar 0,9718 dan RRMSE sebesar 9,43%.

Kata Kunci: perangkat nyamuk, sensor inframerah, ragi, gula.

# **DESIGN AND TESTING OF MICROCONTROLLER-BASED AUTOMATIC MOSQUITO TRAPS TOOLS WITH INFRARED SENSORS**

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Mosquito control is very necessary to overcome the problem of diseases caused and transmitted through mosquitoes, especially dengue fever which can endanger human life. The research carried out aims to design a tool for mosquito eradication, find out the number of mosquitoes trapped in the tool, and test the tool which includes system accuracy and response, as well as analyze data in the form of coefficient of determination ( $R^2$ ), correlation coefficient ( $R$ ), and relative root mean square error.

This research was carried out by designing tools, making tools, testing the results of the design, observing and analyzing data. Tool testing and data analysis include accuracy, system response, coefficient of determination ( $R^2$ ), correlation coefficient ( $R$ ) and relative root mean square error.

The results of this study indicate that an automatic mosquito trap has been successfully designed with the main components, namely Arduino, infrared sensor, UV LED, real time clock (RTC), and micro SD card (MMC) module. The results of the number of mosquitoes obtained using this tool are as many as 259

mosquitoes coming, 203 mosquitoes entering and 184 mosquitoes die for 24 days with an average capture effectiveness of 63.74%, an average capture time of 3.75 seconds and an average time of falling mosquitoes of 3.8 seconds. The results of the performance test of the sensor readings of mosquitoes coming in and mosquitoes getting a determination value ( $R^2$ ) of 0.8616, a correlation coefficient value (R) of 0.9282 and an RRMSE of 28.44%. The results of the performance test of the sensor readings of incoming mosquitoes and dead mosquitoes obtained a determination value ( $R^2$ ) of 0.9444, a correlation coefficient (R) of 0.9718 and an RRMSE of 9.43%.

Keywords: mosquito trap, infrared sensor, yeast, sugar.