

INTISARI

ANALISIS PENGARUH SISTEM PEMELIHARAAN TERINTEGRASI BERBASIS *INTERNET OF THINGS* TERHADAP PERTUMBUHAN BIBIT BAYAM (*AMARANTHUS TRICOLOR L.*)

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Budidaya tanaman sering menghadapi tantangan dalam menjaga stabilitas parameter lingkungan, terutama pada sistem pemeliharaan manual yang rentan terhadap fluktuasi kondisi lingkungan. Penelitian ini bertujuan untuk merancang dan menganalisis efektivitas sistem monitoring dan kontrol otomatis berbasis *Internet of Things* (IoT) dibandingkan sistem manual dalam mengatur kelembapan tanah, suhu udara, kelembapan udara, dan ketersediaan unsur hara pada media tanam. Metode yang digunakan adalah eksperimen komparatif dengan dua perlakuan, yaitu sistem terkontrol berbasis IoT dan sistem manual, dengan pengamatan selama 14 hari pada pertumbuhan bibit bayam hijau (*Amaranthus tricolor L.*).

Hasil penelitian menunjukkan bahwa sistem otomatis mampu menjaga kelembapan tanah lebih stabil pada rentang 58%–81%, sedangkan sistem manual berfluktuasi antara 50%–80%. Pada hari ke-14, rata-rata tinggi tanaman pada sistem otomatis mencapai sekitar 5,5 cm dengan lebar daun 0,49 cm, sedangkan pada sistem manual hanya mencapai tinggi sekitar 5,0 cm dan lebar daun sekitar 0,37 cm. Analisis standar deviasi juga menunjukkan bahwa pertumbuhan tanaman pada sistem otomatis lebih seragam. Dengan demikian, sistem pemeliharaan berbasis IoT terbukti lebih efektif dalam menjaga kestabilan lingkungan serta meningkatkan kualitas pertumbuhan bibit bayam dibandingkan metode manual.

Kata Kunci: *Internet of Things*, *Blynk*, Penyemaian Bayam

ABSTRACT

ANALYSIS OF THE EFFECT OF AN INTEGRATED INTERNET OF THINGS BASED MAINTENANCE SYSTEM ON THE GROWTH OF SPINACH SEEDLINGS (*AMARANTHUS TRICOLOR L.*)

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*Plant cultivation often faces challenges in maintaining the stability of environmental parameters, especially in manual cultivation systems that are prone to environmental fluctuations. This study aims to design and analyze the effectiveness of an Internet of Things (IoT)-based monitoring and automatic control system compared to a manual system in regulating soil moisture, air temperature, air humidity, and nutrient availability in the planting media. The method used in this research was a comparative experimental approach with two treatments: an IoT-based controlled system and a manual system, conducted over a 14-day observation period to evaluate the vegetative growth of spinach seedlings (*Amaranthus tricolor L.*).*

The results show that the automated system was able to maintain more stable soil moisture within a range of 58%–81%, while the manual system fluctuated between 50%–80%. On the 14th day of observation, the average plant height in the automated system reached approximately 5.5 cm with an average leaf width of 0.49 cm, whereas the manual system only reached an average height of 5.0 cm and a leaf width of 0.37 cm. In addition, the standard deviation analysis indicates that plant growth in the automated system was more uniform than in the manual system. Therefore, the IoT-based maintenance system proved to be more effective in maintaining environmental stability and improving the growth quality of spinach seedlings compared to the manual method.

Keywords: *Internet of Things, Blynk, Spinach Seedling Cultivation*