EFISIENSI PENGGUNAAN AIR PADA BUDIDAYA PAKCOY (*Brassica rapa* L.) DENGAN PENAMBAHAN AMANDEMEN TANAH DI LAHAN PESISIR PANTAI BANTUL, YOGYAKARTA

INTISARI

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Penelitian ini bertujuan untuk membandingkan efisiensi penggunaan air pada budidaya pakcoy (*Brassica rapa* L.) melalui penerapan berbagai amandemen tanah di lahan pesisir pantai Bantul, Yogyakarta. Fokus penelitian meliputi karakterisasi iklim mikro, perhitungan kebutuhan air tanaman, kecukupan irigasi, serta evaluasi produktivitas air dan efisiensi penggunaan air irigasi. Penelitian menggunakan rancangan percobaan rancangan acak kelompok (RAK) dengan sembilan perlakuan dan tiga ulangan. Perlakuan tersebut meliputi kontrol pasir (P), pasir biochar (PB), pasir zeolit (PZ), kontrol kimia (CK), kimia biochar (KB), kimia zeolit (KZ), kontrol organik (CO), organik biochar (OB), dan organik zeolit (OZ). Penelitian dilakukan 2 kali tanam pada musim kemarau pada Bulan Juli – Agustus dan Bulan Agustus – September 2025 dan menggunakan sistem irigasi kabut. Evapotranspirasi tanaman (ETc) dihitung menggunakan metode Penman-Monteith. Hasil penelitian menunjukkan bahwa ETc pada musim tanam pertama mencapai 131,52 mm dan meningkat menjadi 154,57 mm pada musim tanam kedua, yang dipengaruhi oleh peningkatan suhu udara serta intensitas radiasi matahari sehingga meningkatkan laju evapotranspirasi. Hasil *Crop Water Productivity* (CWP) pada MT 1 sebesar 12,359 kg/m³ dan pada MT 2 sebesar 1,344 kg/m³, sedangkan nilai *Irrigation Water Use Efficiency* (IWUE) masing-masing sebesar 0,14 kg/m³ (MT 1) dan 0,018 kg/m³ (MT 2). Namun, hasil uji statistik menunjukkan tidak terdapat perbedaan signifikan nilai CWP dan IWUE antarperlakuan amandemen tanah (ANOVA, $p > 0,05$). Hasil penelitian ini menegaskan bahwa variasi musim tanam dan kondisi iklim mikro lebih berperan dalam menentukan kebutuhan dan produktivitas air tanaman pakcoy dibandingkan dengan jenis amandemen tanah. Selain itu, sistem irigasi kabut berfungsi penting dalam menciptakan iklim mikro yang mendukung budidaya di lahan pesisir.

Kata kunci: Pakcoy, Efisiensi Penggunaan Air, Amandemen Tanah, Tanah Pesisir.
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WATER USE EFFICIENCY OF PAKCOY (*Brassica rapa* L.) CULTIVATION WITH SOIL AMENDMENT APPLICATION IN THE COASTAL AREA OF BANTUL, YOGYAKARTA

ABSTRACT

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This study aimed to compare water use efficiency in pakcoy (*Brassica rapa* L.) cultivation through the application of various soil amendments in the coastal area of Bantul, Yogyakarta. The research focused on microclimate characterization, estimation of crop water requirements, irrigation adequacy, and evaluation of crop water productivity and irrigation water use efficiency. The experiment was conducted using a randomized block design with nine treatments and three replications. The treatments consisted of sand control (P), sand + biochar (PB), sand + zeolite (PZ), chemical control (CK), chemical + biochar (KB), chemical + zeolite (KZ), organic control (CO), organic + biochar (OB), and organic + zeolite (OZ). The study was carried out over two planting seasons during the dry season, namely July–August and August–September 2025, using a mist irrigation system. Crop evapotranspiration (ETc) was estimated using the Penman–Monteith method. The results showed that ETc during the first planting season reached 131.52 mm and increased to 154.57 mm in the second planting season, which was influenced by higher air temperature and increased solar radiation intensity, leading to higher evapotranspiration rates. Crop Water Productivity (CWP) was 12.359 kg m^{-3} in the first season and 1.344 kg m^{-3} in the second season, while Irrigation Water Use Efficiency (IWUE) values were 0.14 kg m^{-3} and 0.018 kg m^{-3}, respectively. However, statistical analysis indicated no significant differences in CWP and IWUE among soil amendment treatments (ANOVA, $p > 0.05$). These findings indicate that variations in planting seasons and microclimatic conditions play a more dominant role in determining water requirements and water productivity of pakcoy than the type of soil amendment applied. In addition, the mist irrigation system plays an important role in creating a favorable microclimate for crop cultivation in coastal areas.

Keywords: Pakcoy, Water Use Efficiency, Soil Amendments, Coastal Sandy Soil.
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