RINGKASAN

Konsumsi masyarakat terhadap sayuran bayam terus meningkat. Hal tersebut karena kandungan gizi yang dimiliki oleh bayam. Bayam merah mengandung vitamin C, vitamin E, protein, karbohidrat, lemak, mineral, zat besi, magnesium, mangan, kalium, dan kalsium. Namun ketersediaan bayam merah cenderung menurun pada saat kondisi lingkungan yang kurang menguntungkan. Seperti hujan lebat, angin kencang, alih fungsi lahan, kekeringan air yang terjadi di lahan terbuka. Permasalahan tersebut mendorong pengembangan teknologi pertanian yaitu teknologi budidaya tanaman adaptif terhadap lingkungan sehingga efisien dan efektif. Teknologi tersebut adalah *plant factory*. *Plant factory* dapat menghasilkan produksi yang tinggi dan berkualitas karena lingkungan tumbuh dalam *plant factory* dibuat optimal dan tidak terpengaruh oleh iklim luar. Air sebagai komponen utama pertumbuhan tanaman penting diketahui kebutuhannya untuk setiap tanaman. Bagaimana kebutuhan air tanaman pada penanaman bayam merah di *plant factory* dengan sistem *ebb and flow* belum banyak diinformasikan secara ilmiah. Oleh karena itu tujuan penelitian ini adalah mengetahui kebutuhan air tanaman bayam merah (*Amaranthus tricolor L.*) dengan penanaman dalam ruangan (*plant factory*), mengetahui pengaruh perbedaan jenis intensitas cahaya LED serta iklim mikro terhadap kebutuhan air tanaman. Penelitian ini terdiri dari 2 (dua) set *plant factory* dengan penanaman hidroponik yaitu sistem pasang surut (*ebb and flow*), penambahan lampu LED merah dengan daya 48 watt dan LED biru 48 watt. Data iklim mikro (suhu udara, kelembapan, intensitas cahaya, dan kecepatan angin) dianalisis dengan metode *Penman-Mounteith*. Hasil penelitian menunjukkan bahwa kebutuhan air tanaman bayam merah dipengaruhi oleh penambahan cahaya LED (*Light Emitting Diode*) dan penempatan tanaman di rak *plant factory*. Kebutuhan air tanaman bayam merah pada penambahan lampu dengan LED biru lebih tinggi dibandingkan LED merah. Kebutuhan air tanaman bayam meraah secara berurutan sebagai berikut, 55,41 mm/hari untuk LED biru 48 watt rak ke 2, 25,09 mm/hari untuk LED biru 48 watt rak ke 1, 9,88 mm/hari untuk LED merah 48 watt rak ke 2, dan 6,04 mm/hari untuk LED merah 48 watt rak ke 1.

Kata Kunci : *Plant factory*, Bayam, Iklim Mikro, Kebutuhan Air Tanaman.

SUMMARY

Community consumption of spinach continues to increase. This is because of the nutritional content of spinach. Red spinach contains vitamin C, vitamin E, protein, carbohydrates, fats, minerals, iron, magnesium, manganese, potassium, and calcium. However, the availability of red spinach tends to decrease when adverse environmental conditions. Like heavy rain, strong winds, land use change, water drought that occurs in open land. These problems encourage the development of agricultural technology, namely technology for adaptive crop cultivation to the environment so that it is efficient and effective. The technology is a plant factory. Plant factory can produce high quality production because the growing environment in the plant factory is made optimal and is not affected by outside climate. Water as a major component of plant growth is important to know the needs of each plant. How the plant's evapotranspiration red spinach in the plant factory with the ebb and flow system has not been much scientifically informed. Therefore, the purpose of this study is to determine the evapotranspiration of red spinach plants (Amaranthus tricolor L.) by planting indoors (plant factory), knowing the effect of different types of LED light intensity and microclimate on evapotranspiration. This research consists of 2 (two) sets of plant factories with hydroponic planting, namely ebb and flow system, the addition of red LED lights with 48 watts of power and 48 watt blue LEDs. Micro climate data (air temperature, humidity, light intensity, and wind speed) were analyzed by the Penman-Mounteith method. The results showed that the evapotranspiration of red spinach plants was influenced by the addition of LED light (Light Emitting Diode) and the placement of plants on the plant rack. The evapotranspiration of red spinach plants on the addition of lights with blue LEDs is higher than red LEDs. The evapotranspiration of red spinach plants on the addition of lights with blue LEDs is higher than red LEDs. The need for spinach plants is as follows, 55.41 mm / day for 48 watt blue LEDs for rack 2, 25.09 mm / day for 48 watts blue LEDs for rack 1, 9.88 mm / day for 48 red LEDs watt for rack 2, and 6.04 mm / day for red LEDs 48 watts for rack 1.

Keywords: Plant factory, Spinach, Micro Climate, Evapotranspiration.