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The effect of differences in the use of cocopeat on the yield of melon (*Cucumis melo* L.) Honey globe with a drip irrigation system

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Abstract. Melon (*Cucumis melo*. L) is a horticultural commodity that is in demand and has a relatively high price for both the domestic and export markets and its production in 2013 (125,207 tons), 2014 (150,365 tons) and 2015 (137,887 tons) and only meet the national needs of around 40% (Central Bureau of Statistics, 2017). Cocopeat has the advantage of being able to bind and store water strongly and contains elements such as calcium (Ca), magnesium (Mg), potassium (K), sodium (N), and phosphorus (P). Drip irrigation maintains soil moisture at optimal levels for plant growth. The purpose of this study was to determine growth and production and was carried out in April – July 2020 at SGH Polije. Analysis using t-test, the test results showed that plant height was not significantly different (ns) at 28 DAP, but at 42 DAP it was very significantly different. The number of leaves for the whole was not significantly different, while the diameter of the fruit was very significantly different. Fruit weight and Brix content were not significantly different. This study shows that the planting media used can affect production results but not all of them are different.

1. Introduction

Melon (Cucumis melo. L) is one of the horticultural commodities that have prospects for development in Indonesia. Melon plant fruit is in great demand and has a relatively high price for both the domestic and export markets [1]. Domestic demand for melons tends to increase every year, in line with population growth. Melon production in 2013, 2014, and 2015 was 125,207, respectively; 150,365 and 137,887 tons and only meet the national needs of around 40%, the rest of the needs are met through imports [2].

The increasingly high market demand for melons is still constrained by the limited area of productive land so the choice of technology and appropriate planting techniques can overcome this problem. One of the planting techniques that produce on unproductive land and limited land is the hydroponic system. According to Nelson (2009), the hydroponic system is very much in line with the trend of today's urban consumers, namely looking for quality products, which have added value to health benefits, look attractive, and can be used for a long time. The hydroponic system is the cultivation of plants without using soil.

The growing media used in hydroponic systems can be liquid or solid media. Hydroponic cultivation has several advantages such as more practical maintenance, more efficient use of fertilizers, faster plant

growth, and guaranteed cleanliness, planting can be done continuously regardless of the season, harvesting scheduling can be done so that it can produce plants continuously, and the selling price of hydroponic plants is more expensive [3]. Righteousness planting media should also be considered by looking for media that can provide water and nutrients in sufficient quantities for plant growth. Organic materials, especially those that are waste, which is abundantly available and inexpensive, can be used for alternative growing media that are difficult to replace.

The utilization of organic materials such as coconut husk (cocopeat) has the potential to be used in a composite as a planting medium. Processed young coconut drinks are now easy to find in culinary places, of course, what is used from young coconuts is water and meat. Meanwhile, the shell and coir will become waste and have not been used optimally. Young coconut waste has coir that can be used as a planting medium. Organic matter has crumb properties so that air, water, and roots easily enter the soil fraction and can bind water. This is very important for the roots of plant seeds because the growing medium is closely related to root growth or the nature of plant roots [4]. The advantages of cocopeat as a growing medium have characteristics that can bind and store water strongly and contain essential nutrients, such as calcium (Ca), magnesium (Mg), potassium (K), sodium (N), and phosphorus (P) [5].

Drip irrigation as defined [6]is a method of providing water with a low discharge. The drip irrigation system can save water use because it can minimize water losses that may occur, such as losses due to percolation, evaporation, and runoff, so drip irrigation is suitable for high economic value crops that are needed by the market. Drip irrigation scheduling regulators generally use a timer that can work at certain time intervals according to the given settings.

Based on the explanation above, the effect of planting a drip irrigation hydroponic system in a greenhouse on melon plants is to increase land productivity and is also expected to provide maximum profits. The purpose of this study was to determine the growth and yield of melon plants in a drip irrigation hydroponic system with the use of different cocopeat and to determine the feasibility of melon farming using a drip irrigation hydroponic system with the use of different cocopeat.

2. Methods

The research was carried out from April to June 2022. The location of the implementation was at the Smart Green House of the Jember State Polytechnic with an altitude of 89 meters above sea level and an air temperature of 22 – 32 ºC. The method used is cultivating with a drip irrigation hydroponic system. Melon cultivation is done by preparing 200 polybags which are divided into 2 parts. Treatments using cocopeat and topsoil planting media were 120 polybags with a ratio of 1: 1 medium bucket size and the remaining 80 polybags were used for cocopeat planting media treatment. Data were analyzed using a t-test. The t-test is a simple test used to compare which treatment is better applied.

3. Result and Discussion

Observation of the honey globe melon plant is an observation of growth and observation of production. Growth observations included plant height, number of leaves, and diameter of melons aged 14 DAP, 28 DAP, 42 DAP, and 56 DAP. Observations on melon production included the fresh weight of melon per plant sample and levels of fruit sweetness (Brix) per sample.

3.1. Melon Plant Height Per Sample

Observation data on plant height in melons started from the age of 14 DAP to 56 DAP, both in the drip irrigation hydroponic system. Based on the data in Figure 4.1, it was obtained that the average plant height at 14 DAP was 21.85 cm for cocopeat planting media and 23.85 cm for cocopeat + topsoil planting media. The average yield of 28 DAP was 44.55 cm for cocopeat growing media and 48.3 cm for cocopeat + topsoil planting media. At 42 DAP the average plant height was 111.5 cm for cocopeat growing media and 124.325 cm for cocopeat + topsoil planting media. At 56 DAP the average plant height was 203.5 cm for cocopeat growing media, while the average melon plant height for cocopeat + topsoil was 212.575 cm.

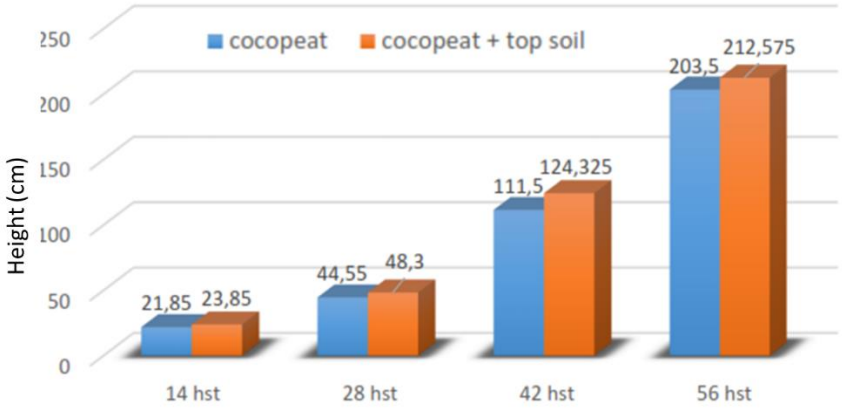

Figure 1. Melon plant average height.

The results of the recapitulation of the t-test at the height of melons aged 14 DAP showed that the results were not significantly different (ns), at 28 DAP the results were significantly different (*), while for 42 DAP and 56 DAP the results showed a very significant difference (**), between the media treatments. planting cocopeat and planting media cocopeat + topsoil. The parameter for observing melon growth is plant height per sample plant. The results of the t-test showed that the observation of plants aged 14 DAP showed no significant difference (ns), and at 28 DAP began to show the difference by getting results (*) which meant significantly different, while 42 DAP and 56 DAP plant heights of melon with mixed planting media. from topsoil and cocopeat showed a very significant difference (**) compared to plant height using only cocopeat growing media. The difference occurred because at the beginning of plant growth the irrigation system used was problematic, so manual watering was carried out which was estimated to have a lack of nutrients. Meanwhile, the observation after age from 28 DAP to 56 DAP showed a fairly striking difference, melon plant height on topsoil and cocopeat growing media grew faster than plant height on cocopeat growing media [7], [8].

3.2. Number of Melon Plant Leaves

Observation data on the number of leaves of melon plants aged 14 DAP to 56 DAP, in a drip irrigation hydroponic system. Based on the data from Figure 4.2, the average number of melon leaves aged 14 DAP was 4.3 for cocopeat growing media and 4.675 for cocopeat + topsoil planting media. The results of the average number of leaves aged 28 DAP on cocopeat growing media were 8.9 and 9.775 for cocopeat + topsoil planting media. At 42 DAP the average number of melon leaves for cocopeat growing media was 22.3 and for cocopeat + topsoil, planting media was 23.775.

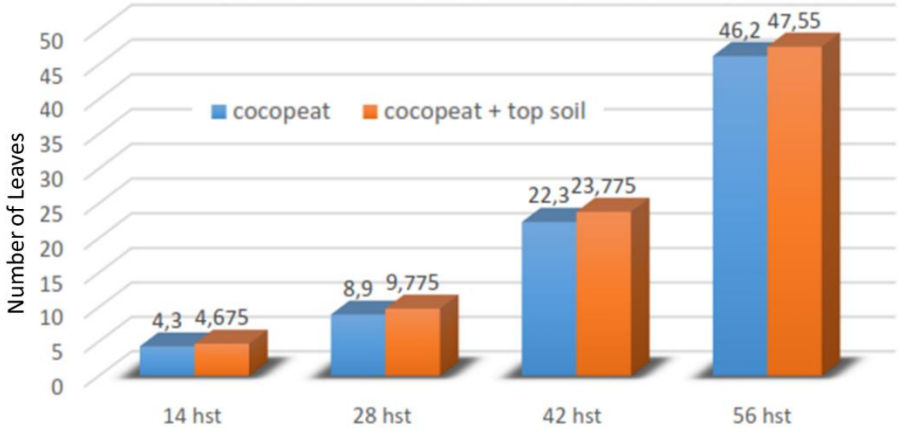

Figure 2. Melon Plant Leaves Average.

The average yield at 56 DAP was 46.2 for cocopeat growing media, while 47.55 for cocopeat + topsoil planting media. The results of the recapitulation of the t-test on the number of leaves of melon plants aged 14 DAP to 56 DAP showed that the results were not significantly different (ns). Parameters of the number of leaves in this study ranging from 14 DAP to 56 DAP showed the results (ns) which meant that the results were not significantly different. Leaf growth on melon plants is not much different from topsoil and cocopeat garden media with cocopeat planting media. This happens probably because the nutrients and water that each plant gets are the same and proves that hydroponics using drip irrigation can produce and produce the same quality [9].

3.3. Melon Plant Fruit Diameter

Observation data on the diameter of melons at the age of 42 DAP to 70 DAP, in a drip irrigation hydroponic system. Based on the data from Figure 4.3, it was obtained that the average diameter of melons aged 42 DAP was 20.8 for cocopeat growing media and 24.125 for cocopeat + topsoil planting media. The average yield of fruit diameter at 56 DAP on cocopeat growing media was 41,275 and 47,75 for cocopeat + topsoil planting media. At 70 DAP the average diameter of melons for cocopeat growing media was 71.575 and for cocopeat + topsoil, planting media was 80.125. The results of the recapitulation of the t-test on the diameter of melons aged 42 DAP to 70 DAP showed very significant differences (**). Melon fruit diameter observations were carried out on plants aged 42 DAP which had previously been pollinated. The diameter of the fruit did not experience a significant difference, but it can be seen that the diameter of the fruit using topsoil and cocopeat planting media was larger than the cocopeat growing media. At 56 DAP the diameter of the fruit did not look different. This observation produces (**) which means that the difference is very significant. Fruits produced from plants that use topsoil and cocopeat growing media are larger because the growing media can maintain the stability of nutrients and nutrients [10].

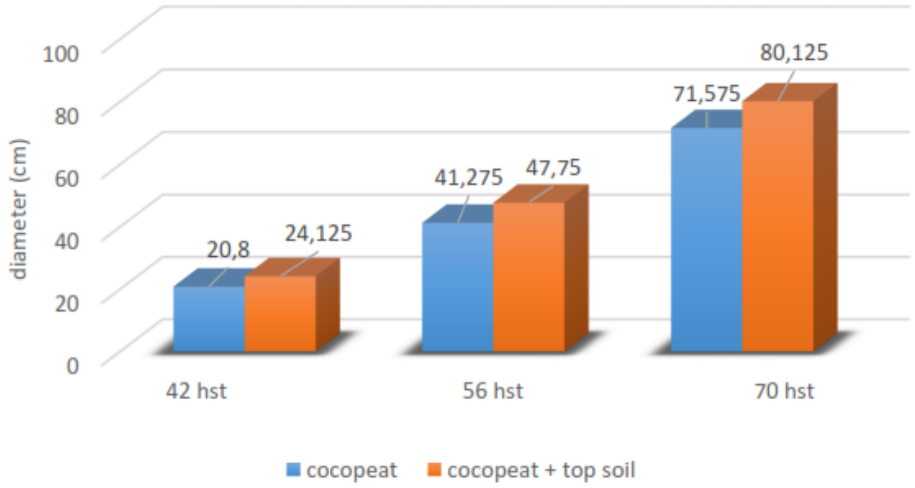

Figure 3. Melon Plant Fruit Diameter Average.

3.4. Fruit Weight per sample plant (kg)

Parameter data of melon fruit weight in drip irrigation hydroponic system. Based on data from diagram 4.4, it was obtained that the average fruit weight of melon plants using cocopeat growing media was 1.35 kg, while for the treatment of cocopeat and topsoil planting media it was 1.925 kg. The results of the recapitulation of the t-test on the fruit weight of melon plants showed that the results were not significantly different (ns). The average weight of melons produced for cocopeat growing media is 1.35 kg while the fruit weight for topsoil and cocopeat growing media is 1.9 kg. Based on the t-test showed that the weight of melon fruit was not significantly different (ns). This drip irrigation system produces stable nutrients, but the planting media used may not necessarily be able to maintain and store the supply of nutrients and nutrients provided.

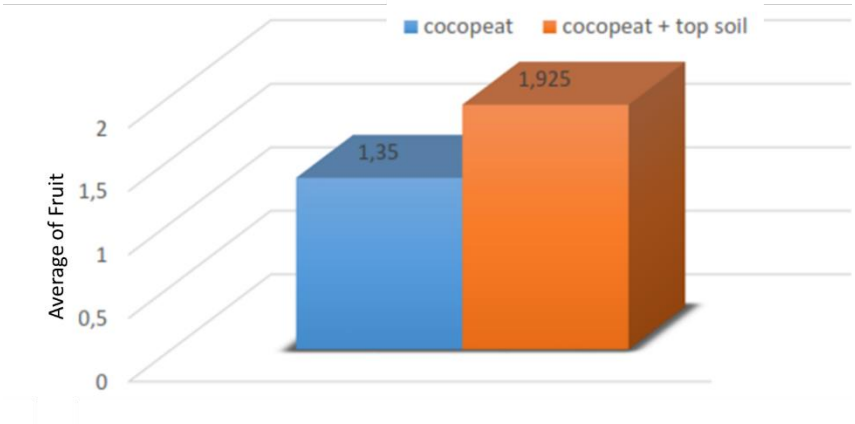

Figure 4. Average Fruit Weight of Melon Plants.

3.5. Fruit sweetness level (Brix)

Parameter data of melon fruit sweetness level in drip irrigation hydroponic system. Based on data from diagram 4.5, it was obtained that the average level of fruit sweetness in melon plants using cocopeat growing media was 11.655%, while for the treatment of cocopeat and topsoil planting media was 12.64%. The results of the recapitulation of the t-test on the sweetness level of melon plants showed that the results were not significantly different (ns). Parameters of Brix levels or sweetness levels in melons were carried out during and after harvest. Based on the t-test conducted, showed that melon plants using topsoil and cocopeat planting media with cocopeat planting media were (ns) or not significantly different. The average Brix level given for topsoil and cocopeat planting media treatment was 12.64 and for cocopeat growing media 11.65 where it can be seen that the difference is very thin. From this data, the levels of brix produced from the drip irrigation hydroponic system are not much different even though the media used is different. Cocopeat growing media can still provide nutrients to increase the sweetness of the fruit. The level of sweetness of the fruit also cannot be seen from the size of the fruit, because the fruit is produced from melon plants that use cocopeat growing media, the sweetness level is not too different from melon plants that use topsoil and cocopeat planting media even though the diameter of the fruit produced is smaller [11].

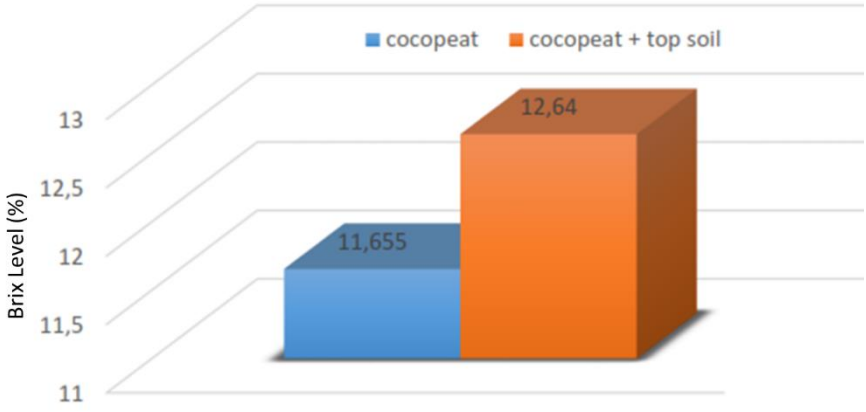

Figure 5. Average Sweetness Levels of Melon Plants.

The results of the Honey Globe melon produced when compared with the description of the Honey Globe melon plant are less than optimal. The Honey Globe plant which should be able to produce fruit sweetness levels of up to 16% only produces an average of 12%, as well as weight of the fruit which should be able to produce a weight of up to 2.5 kg per fruit this time in the farming [12]. it only gains an average of 1.5 kg. However, the diameter of the fruit, the number of leaves, and the height of the plant are not so much different and can even be said to be the same[13]. The fruit circumference or fruit diameter in this cultivation is righteousness because the fruit produced can be larger than the Honey

Globe melon plant description [14]. If the nutrients increase, especially nitrogen increases, the chlorophyll also increases so that the photosynthate produced also increases and is accumulated in the growth of plant length and number of leaves [15].

4. Conclusion

The effect of differences in the use of cocopeat on the yield of melons (*Cucumis melo* L.) Honey globe with a hydroponic system of drip irrigation can be concluded that the plant height parameters in this study showed insignificant differences at 28 DAP, but at 42 DAP and so on, it showed significant differences. The number of leaves did not show a significant difference, while on the contrary, the diameter of the fruit showed a very visible difference between the two planting media treatments. The fruit weight and brix content produced from this study also did not show a very significant difference, although the weight of the fruit produced was heavier the level of sweetness was not too far in comparison.

5. Acknowledgment

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