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Planting Media Effectiveness on Celery *(Apium graveolens L.)* Growth

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ABSTRACT

The study on the effectiveness of different planting media for growing celery (Apium graveolens L.) took place in Desa Tapis, Kabupaten Paser. Researchers set out to explore how various planting media could impact celery growth, using a randomized block design with three repetitions to ensure the results were reliable. The planting media tested included a control group (y1), a mixture of top soil and palm compost (y2), and a combination of top soil and husk charcoal (y3). The results were quite revealing. The different planting media had a significant impact on several growth factors, including the average height of the plants measured at 2, 4, and 6 weeks after planting (WAP). Other important metrics, such as the number of petioles and tillers at 6 WAP, as well as the fresh weight harvested at 6, 7, and 8 WAP, also showed notable differences. Additionally, root length measurements taken at 9 WAP highlighted the effectiveness of the planting media. Among the options tested, the combination of top soil and palm compost (y2) stood out as the best choice for promoting celery growth. This particular mix not only resulted in taller plants but also increased the number of petioles and tillers, along with greater fresh weight and root length. These findings suggest that using top soil with palm compost can significantly enhance celery growth, offering valuable insights for farmers and gardeners looking to improve their celery yields.

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1. INTRODUCTION

Celery is a vegetable which benefits are quite well known in Indonesia. The celery leaves can be consumed as garnish in dishes and the seeds can be used as flavoring ingredients and even the oil extracts can be used as medicine. Celery is an agricultural product that has vitamins A, C, iron (Fe) and other nutritional values that are quite high in terms of good for health when consumed (Trizayuni, Ardi, and Warnita 2022).

The advantages of organic matter, bokashi or oil palm empty bunch compost (TKKS) have a high nutrient content such as; N, P, K Fe and micronutrients present in the soil. The provision of TKKS organic matter in planting media has the potential to improve physical, chemical and biological qualities. In addition, palm oil compost has many advantages, including improving the texture of light clay soil, facilitating the decomposition of nutrients for plant growth, and reducing the risk of becoming a vector of plant pests. Organic

matter from TKKS is a material that is not easily washed by water that seeps into the soil and can be applied to various planting media (Battong, Wahdah, and Rusmayadi 2018).

Planting media is a place for plants to grow that provide several important needs for plant growth as well as for physiological activities such as nutrients, water and air. Some planting media that are included in the organic category generally come from components of living orgsnism, for example parts of plants such as fruits, leaves, flowers, stems or bark. The use of organic matter is far superior when compared to the use of inorganic materials. The organic fertilizer from animal manure which is referred to as manure can be applied in liquid or solid form (Handayani et al. 2023).

The test of the superiority of organic matter applied to the planting media will be carried out through a study entitled Planting Media Effectiveness On Celery (*Apium graveolens L)* Growth.

2. METHODOLOGY

This research was carried out for four months starting from media preparation to the cultivation process and measurement of plant samples. The research was carried out in Desa Tapis, Kabupaten Paser. The tools and materials used in this study are celery seeds, top soil, palm level compost, cow manure, rice husk charcoal, NPK fertilizer, wood, nails, rope and furadan 3 GR, hoe, machete, saw, hammer, scissors, knife, ruler, paranet 60%, polybag size 8 x 15 cm, polybag size 30 x 30 cm, handprayer capacity 1 liter, locks, stationery, digital scales, 150 liter water barrels, research labels, cameras, soil pH (Soil Tester).

This study was designed using Group Random Design (RAK). The composition of various planting media (Y) consists of 3 levels, namely y1 = control, y2 = top soil and palm oil level compost, y3 = top soil and husk charcoal. A total of 3 treatments were used consisting of 9 combinations, repeated 3 times. Each treatment group contains 4 sample plants, so the number of sets per replicate is 9 x 4 = 36 sample plants, but the total population is 36 x 3 = 108 plants.

The data obtained from the observation results were analyzed to determine the influence of various planting media on celery growth. The data obtained were analyzed by fingerprints. If the value of the fingerprint variety has an unreal effect (F calculation of treatment < F table 0.05) no further test is carried out, if the fingerprint of the variety has a real effect (F calculation of treatment > F table 0.05), then it is carried out with a further test of real difference (BNT) at the level of 5%.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1 Average plant height

The results of the analysis of various planting media (Tabel 1.) showed that the planting medium of top soil and oil palm level compost fertilizer (Y2) had an average plant height of more than (30.73%) that was significantly different from the Y3 treatment although it was not significantly different from the Y1 treatment.

Table 1. The results of the analysis of various planting media on average plant height parameter

Planting Media (Y)			Average
y1	y2	y3	
27,85	36,81	27,81	30,82 [a]
27,84	28,73	25,86	27,48 [ab]
25,85	26,63	22,70	25,06 [b]
27,18 [ab]	30,73 [a]	25,46 [b]	

*The average number followed by different letters shows a significant difference based on the BNT test of 0.05 (BNT = 5.21).

3.1.2 Average number of stalks

The results of the analysis of various planting media (Tabel 2.) showed that the treatment of planting media (Y) had a very real effect on the average number of celery leaf stalks. The results of the BNT 0.05 test can be seen in table 2.

Table 2. The results of the analysis of various planting media on celery leaf stalks parameter

Planting Media (Y)			Average
y1	y2	y3	
8,00	9,67	7,83	8,50 [a]
7,58	8,00	7,00	7,53 [ab]
7,00	7,25	6,58	6,94 [b]
7,53 [ab]	8,31 [a]	7,14 [b]	

*The average number followed by different letters shows a real difference based on the BNT test of 0.05 (BNT = 1.04).

The results of the BNT 0.05 test showed that the combination of planting medium showed that the top soil planting medium and oil palm level compost fertilizer (Y2) had a higher average number of leaf stalks (8.31%) which was significantly different from the Y3 treatment but not significantly different from the Y1 treatment.

3.1.3 Average number of saplings

The results of the variegated fingerprint analysis showed that the treatment of various types of planting media (Y) had a very real effect on the average number of celery saplings. The results of the BNT 0.05 test can be seen in Table 3.

Table 3. The results of the analysis of various planting media on number of saplings parameter

Planting Media (N)			Average
y1	y2	y3	
2,00	2,83	1,92	2,25 [a]
1,67	2,00	1,75	1,81 [ab]
1,42	1,83	1,25	1,50 [b]
1,69 [b]	2,22 [a]	1,64 [b]	

* The average number followed by different letters shows a real difference based on the BNT test of 0.05 (BNT = 0.49).

The results of the BNT 0.05 test showed that the treatment of various planting media showed that the planting medium of top soil and oil palm level compost fertilizer (Y2) had a higher average number of saplings (2.22 clumps) which was significantly different from the treatment of Y1 and Y3.

3.1.4 Fresh weight of the harvest

The results of the variegated fingerprint analysis showed that the treatment of various types of planting media (Y) had a very real effect on the fresh weight of the harvest. The results of the BNT 0.05 test can be seen in table 4.

Table 4. The results of the analysis of various planting media on fresh weight parameter

Planting Media (Y)			Average
y1	y2	y3	
24,67	40,67	20,00	28,44 [a]
19,33	30,00	17,67	22,33 [ab]
15,00	18,33	17,33	16,89 [b]
19,67 [b]	29,67 [a]	18,33 [b]	

* The average number followed by the unequal letters shows a significant difference based on the BNT test of 0.05 (BNT = 9.13).

Based on the results of the BNT 0.05 test, it was shown that the treatment of various planting media showed that the planting media of top soil formulation and oil palm level compost (Y2) had a higher average fresh weight of harvest (29.67 grams) which was significantly different from the Y1 and Y3 treatments. The observation results showed that the increase in the growth of the number of petioles in the treatment of various planting media with top soil planting media and palm level compost fertilizer (Y2).

3.1.5 Average root length

The results of the variegated fingerprint analysis showed that the treatment of various types of planting media (Y) had a very significant effect on root length. The results of the BNT 0.05 test can be seen in table 5.

Table 5. The results of the analysis of various planting media on average root length parameter

Planting Media (Y)			Average
y1	y2	y3	
12,73	14,30	12,00	13,01 [a]
10,00	12,87	11,00	11,29 [ab]
10,17	12,50	9,70	10,79 [b]
10,97 [b]	13,22 [a]	10,90 [b]	

* The average number followed by different letters shows a real difference based on the BNT test of 0.05 (BNT = 2.21).

Based on the results of the BNT 0.05 test, it was shown that the treatment of various planting media formulations showed that the top soil planting medium and oil palm level compost fertilizer (y2) had a higher average root length (13.22 cm) which was significantly different from the treatment of Y1 and Y3.

3.2. Discussion

3.2.1. Average plant height

Normal growth for plants requires certain nutrients and is in constant quantity and balance. TKKS compost has the potential to increase the availability of nutrients in the soil, increase porosity and increase the ability of soil to store water. Such conditions allow the soil to become more fertile so that nutrients can be absorbed properly by plants(Handayani et al. 2023).

3.2.2 Average number of stalks

The observation results showed an increase in the growth of the number of petioles in the treatment of various planting media with top soil planting media and oil palm level compost fertilizer (Y2). This is due to the content of elements that play a role in plant development, especially in the growth of shoots and the development of stems and leaves in organic media. If the development of roots and leaves and the formation of buds in plants require the availability of large nutrients. The ability of plants to produce leaves is a sign of plant productivity because leaves are the place where photosynthesis occurs for plants. Organic matter contains compounds consisting of one or more nutrients, if given to the planting medium can function as a substitute for nutrients that have been used by plants. TKKS fertilizer has great potential as a soil conditioner and plant nutrients (Galingging 2021; Hastuti 2009).

3.2.3 Average number of saplings

The results of the analysis showed that the increase in the growth of the number of saplings was applied to the combination of top soil planting media formula and oil palm level compost (y2). This is due to the sufficiency of nutrients according to the needs of plants so that plants grow more optimally. The number of plant roots is affected by phosphorus elements and the impact of propagating roots is to make the number of seedlings and plant height better. The elements nitrogen and phosphorus in the soil can affect the number of plant saplings. If the nutrient content is sufficient for needs, the plant can produce a large number of saplings (Kurniadie 2002; Qibtiyah 2019). The result of cell enlargement and differentiation expressed by the change or addition of parts of the plant is the result of photosynthetics in plants. TKKS compost can improve sibiolgi and physical properties in soil (Elfiati and Siregar 2010).

3.2.4 Fresh weight of harvest

This is due to plants that need water and nutrients to meet plant needs. The absorption of nutrients and water by the roots affects the height of the plant and the number of leaves, which in turn affects the height of the plant and the number of leaves harvested per weight of fresh celery. The better the plant grows, the higher the plant weight. Plant growth and development refers to the final stage of vegetative development, including cell enlargement, elongation of plant cells, asymmetry accumulation that arises from the effect of the fulfillment of nutrients and water in plants. The weight of all plant parts is the result of the fulfillment of nutrients and water in plants which are supported by the size and number of plant parts (Kaya 2018; Pratiwi, Susana, and Abdurrahman 2023).

TKKS compost is able to improve the configuration of properties in soil including physical, biological, and chemical properties. The increase in plant size, number of shoots, number of leaves and diameter of plant stems is influenced by nutrients, water and the yield of photosynthesis (Elfiati and Siregar 2010).

3.2.5 Average root length

The observation results showed that the increase in the growth of the number of petioles in the treatment of various planting media with top soil planting media and palm level compost fertilizer (Y2). This is due to the fulfillment of nutrients for plants. Nutrients in Planting Media Affect Vegetative Development and Growth in Plants. The availability of phosphorus contained in planting media is useful for stimulating plant root growth. Organic matter contained in TKKS has the potential to trigger soil microbiological activity, TKKS compost is able to improve drainage and increase water binding. Organic matter can restructure soil composition to facilitate nutrient absorption by plants (Kaya 2018; Rarizy, Savitri, and Bustami 2023).

4. CONCLUSION

The combination of top soil planting medium and palm oil level compost fertilizer provided a higher average plant growth (30.73%), a higher average number of petioles (8.31%), a higher average number of saplings (2.22%), a higher average wet weight of the harvest (29.67 grams) and a higher average root length (13.22 cm).

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