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THE EFFECTIVENESS OF COCOPEAT AS A PLANTING MEDIA ON THE GROWTH OF SOME OIL PALM VARIETIES (*Elaeis guineensis Jacq*)

Fenty Maimunah Simbolon[1], Noverina Chaniago[1], Abdul Hakim Hutasuhut[1]
[1] Faculty of Agriculture, Universitas Islam Sumatera Utara, Medan, Indonesia
[*)] Corresponding Author : fenty.simbolon@gmail.com
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Abstract. The purpose of the study was to determine the growth of several oil palm to the application of cocopeat as a growing medium. This research was carried out at the Experimental Garden of the Faculty of Agriculture, Islamic University of North Sumatra, Medan, which is located on Jalan . Karya Wisata, Johor Building, Medan Johor District, Madya City, North Sumatra Province with an altitude of ± 25 m above sea level, air humidity (RH) 68% and flat topography. The research was carried out from January-March 2016. This research used a factorial randomized block design (RBD) with two factors, namely: Cocopeat as a planting media mixture consists of 4 levels: C0 = Topsoil (Control) , C1 = Topsoil: cocopeat not soaked (2: 1) , C2 = Topsoil: cocopeat soaked in a bucket (2: 1) , C3 = Topsoil: cocopeat soaked in running water (2: 1) . The use of several varieties of oil palm consists of 3 levels: V1 = Simalungun SP540 DXP , V2 = Yangambi DXP PPKS718 , V3 = Langkat DXP Langkat. The research results showed that the growth of several oil palm varieties had no significant effect on all treatment parameters. The use of cocopeat had a significant effect on the number of leaves, but had no significant effect on plant height, leaf area , leaf chlorophyll, base weight and dry weight. Good growth was seen when cocopeat was soaked in C3 running water. The interaction of cocopeat with several oil palm varieties had a significant effect on the number of leaves of oil palm seedlings, whereas it had no significant effect on the other treatments.

Keywords: Varieties, Cocopeat, Palm Oil

I. INTRODUCTION

Oil palm (*Elaeis guineensis* Jacq) is a plantation crop Indonesia has high economic value. Oil palm plants are Indonesia's main superior commodity. This plant, whose main products consist of crude palm oil (CPO) and palm kernel oil, Palm Kernel Oil (PKO), has high economic value and is one of the largest contributors to the country's foreign exchange compared to other plantation commodities (Putranto, 2014) .

The palm oil commodity is a very promising trade commodity, because palm oil is believed to not only be able to produce various downstream industrial products that humans need, such as cooking oil, butter, soap, cosmetics, but also as a substitute for fuel oil, which is currently mostly filled with petroleum (Tani Work Development Team, 2009) .

The increase in the area of oil palm plantations causes the need for the availability of oil palm seeds in large quantities, for To produce oil palm seeds, you must carry out seeding, nursery is the first step in a whole series of oil palm cultivation activities which greatly influences plant productivity and plant lifespan production (Jannah *et al* ., 2012). Good seedling growth in the nursery will also produce good plant growth in the field, on Planting media for oil palm plant nursery activities must be strictly used Note, a good planting medium is one that is able to provide three The basic needs for plants are nutrients, water and good air circulation in in the soil which guarantees the process of root respiration in the soil (Bambang , 2010) .

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Oil palm plants require a planting medium that is permeable (easily allows water to pass through, facilitates the absorption of water and air in the soil) and a thick layer of soil, as well as water content in the soil that is appropriate to the plant's needs (Pahan, 2013).

In the world of organic-based agriculture, using coconut fiber as solid fertilizer plays an important role in the fertility of agricultural land. In solid organic fertilizer, cocopeat/coconut powder functions as a biopore for the soil. The presence of cavities in the soil can improve air circulation to bring oxygen which plants really need . Cocopeat is a fine grain or powder of fiber coconut , the benefits of coconut fiber are very large for agriculture. The nutrient content of coconut fiber, both macro and micro, turns out to be really needed by plants (Agustin , 2010) .

The content of macro and micro nutrients found in coconut fiber, among others (K) Potassium, (P) Phosphorus, (Ca) Calcium, (Mg) Magnesium, (Na) Sodium and several other minerals . However, of the many nutrients contained in Cocopeat has, it turns out that the most abundant amount is the element (K) potassium. As we already know that content of (P) Phosphorus and (K) Potassium Plants really need it during the fruit formation process and to improve the taste of all types of fruit (Anonimus, 2014) .

II. RESEARCH METHODS

This research was carried out at the Experimental Garden of the Faculty of Agriculture, Islamic University of North Sumatra, Medan, which is located on Jalan . Karya Wisata, Johor Building, Medan Johor District, Madya City, North Sumatra Province with an altitude of ± 25 m above sea level, air humidity (RH) 68% and flat topography. The research was carried out from January-March 2016.

This research used a factorial randomized block design (RAK) with two factors, namely: Cocopeat as a planting media mixture consists of 4 levels: C0 = Topsoil (Control) , C1 = Topsoil: cocopeat not soaked (2: 1) , C2 = Topsoil: cocopeat soaked in a bucket (2: 1) , C3 = Topsoil: cocopeat soaked in running water (2: 1) . The use of several varieties of oil palm consists of 3 levels: V1 = Simalungun SP540 DXP , V2 = Yangambi DXP PPKS718 , V3 = Langkat DXP Langkat .

The planting medium used in this research is topsoil. Topsoil soil is taken from the top soil layer, the tamah topsoil layer starts from the top soil surface to a depth of ±30 cm. Then the land is cleaned of existing rubbish , after that the soil and cocopeat requirements are calculated according to the treatment. After calculating how much is needed, then mix the soil with cocopeat in a ratio of 2 : 1 and after that it is filled into 2 size polybags kg according to treatment.

III. RESEARCH RESULT AND DISCUSSIONS

RESULTS

1. Seed Height (cm)

The results of the analysis showed that cocopeat treatment had no significant effect on the height of oil palm seedlings at the age of 1 2 WAP. This can be seen in Table 1.

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Table 1. Average increase in height of oil palm seedlings (cm) at 12 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Variety	Cocopeat				Average
	C0	C1	C2	C3	
V1	26.72	23.78	25.78	27.44	25.93
V2	25.78	25.11	25.44	26.28	25.65
V3	25.44	26.72	24.00	25.22	25.35
Average	25.98	25.20	25.07	26.31	

Note: Numbers that are not followed by notation in each treatment column indicate an insignificant effect.

Giving cocopeat and the response of several oil palm varieties did not have a significant effect on the height of oil palm seedlings as can be seen in (Table 1), however there was a different trend in the treatment given cocopeat, namely treatment C3 (Cocopeat soaked in flowing water) with an average of 26.31 cm and followed by the difference in C0 (control) which was 25.98 cm and C1 (cocopeat not soaked) which had an average seed height of 25.20 cm, while treatment C2 (cocopeat soaked in a bucket) had an average plant height of 25.7 cm.

For the treatment of several oil palm varieties, the effect was not significant, but if we look at the data on the average height of oil palm seedlings in (Table 1), there is a tendency that the treatment of several good oil palm varieties is V1 (Simalungun), namely 25.93cm, followed by V2 (Yangambi) is 26.65 , while V3 (Langkat) has a plant height of 25.35.

The interaction between the cocopeat soaking treatment and several oil palm varieties did not have a significant effect, but it can be seen in (Table 1), there was a tendency that the best combination was in the C3V1 treatment (top soil: cocopeat soaked in running water and the Simalungun variety) where the increase was high. plant 27.44 cm.

2. Number of Leaves (pieces)

The results of the analysis show that the cocopeat comparison treatment has an effect significant effect on the number of leaves of oil palm seedlings at the age of 1 2 WAP. This can be seen in Table 2.

Table 2 . Average Number of Palm Oil Seedling Leaves (strands) at 12 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Peat Water	Rice Husk				Average
	C0	C1	C2	C3	
V1	5.11 d	5.44 c	5.33 cds	5.67 ab	5.39
V2	5.89 a	5.22 d	5.33 c	5.56 b	5.50
V3	5.22 d	5.44 bc	5.89 a	5.89 a	5.61
Average	5.41 ab	5.37 b	5.52 a	5.70 a	

Note: Numbers followed by letters that are not the same indicate influence which is significant in the same treatment group at the 5% level based on the DMRT test.

The average difference test for cocopeat treatment as a planting medium in (Table 2) can be seen to show a real influence on the number of leaves of oil palm seedlings. The treatment of giving cocopeat soaked in running water (C3) with an average of 5.70 , was the best number of leaves, but the C3 treatment was not significantly different from the C2 treatment but was significantly different from the C0 and C1 treatments. This is made clear in Figure 1.

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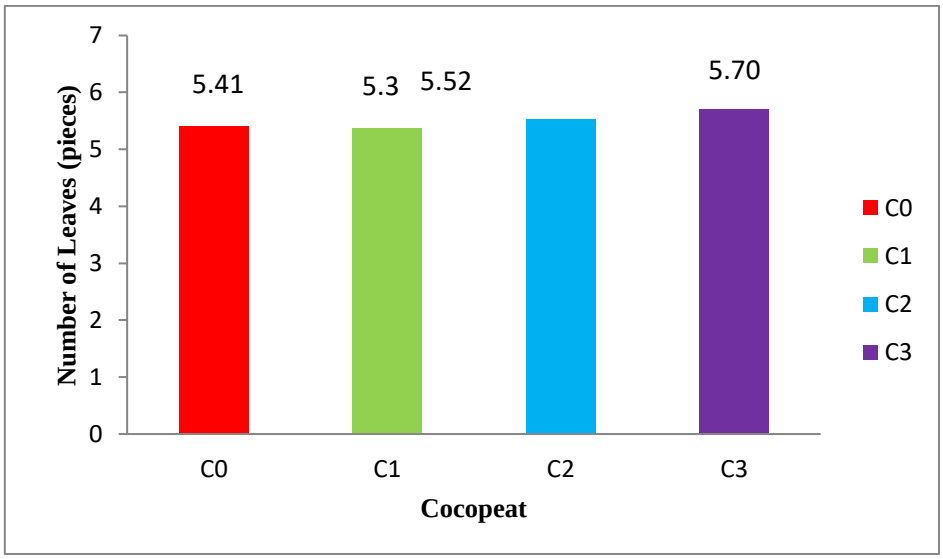

Figure 1. Histogram of the Number of Leaves of Oil Palm Seedlings with Cocopeat Treatment of Several Oil Palm Varieties

In (Table 2) it can be seen that several varieties did not show a real effect, namely with the average V3 (Yangambi) number of leaves 5.61 followed by the average variety V2 (Langkat) 5.50 and variety V1 (Simalungun) 5.61.

The interaction between the treatments of several varieties of oil palm seeds and the best combination of treatments can be seen in the treatments in Figure 2

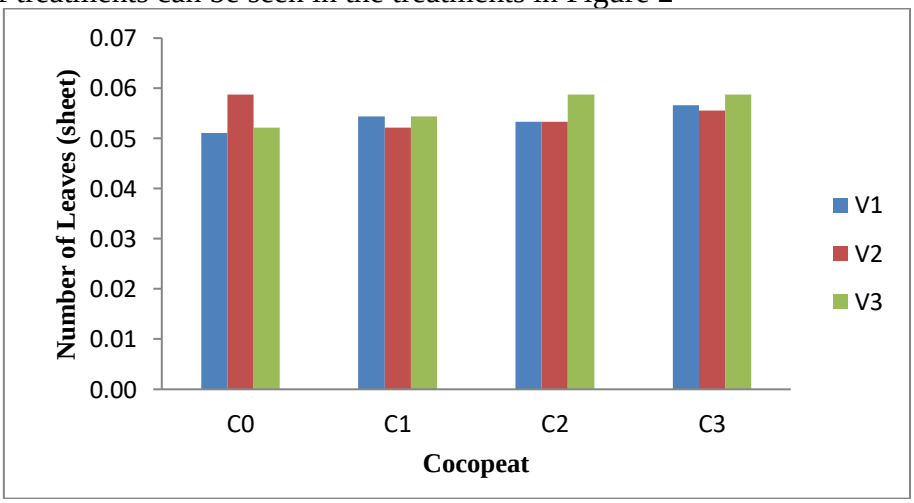

Figure 2. Interaction Relationship between the Two Factors on the Number of Leaves

3. Leaf Area (cm^2)

The results of the analysis showed that the comparative treatment of planting media had no significant effect on the leaf area of oil palm seedlings at the age of 14 WAP . This can be seen in Table 3 .

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Table 3. Average Leaf Area of Oil Palm Seedlings (cm ^{2}) at 14 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Variety	Cocopeat				Average
	C0	C1	C2	C3	
V1	70.33	79.78	75.63	80.94	76.67
V2	78.71	78.10	81.65	76.55	78.75
V3	70.99	73.97	76.45	82.24	75.91
Average	73.34	77.28	77.91	79.91	

Description: Numbers that are not followed by notation in each treatment column shows no real effect.

The cocopeat treatment and the response of several oil palm varieties can be seen in (Table 3), that there is no real effect on oil palm leaf area, but there is a different trend in the cocopeat treatment, namely the C3 treatment with an average of 79.91 mm and followed by a difference in C2 namely 77.91, and C1 which has an average leaf area of 77.28, while the C0 treatment has an average leaf area of 73.34.

For the treatment of several oil palm varieties, the effect was not significant, but if we look at the data on the average area of oil palm leaves in (Table 3), there is a tendency that the treatment of several good oil palm varieties is V2, namely 78.75, followed by V1, namely 76.67 and followed by V3 with a leaf area of 75.91.

The interaction between the cocopeat soaking treatment and several oil palm varieties did not have a significant effect, but it can be seen in (Table 3), there was a tendency that the best combination was in the C3V3 treatment where the increase in leaf area was 82.24 .

4. Chlorophyll (granules/mm ^{2}).

The results of the analysis showed that the cocopeat treatment had no significant effect on the leaf chlorophyll of oil palm seedlings at the age of 1-4 WAP . This can be seen in Table 4.

Table 4. Average Chlorophyll of Palm Oil (grains/mm ^{2}) at 14 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Variety	Cocopeat				Average
	C0	C1	C2	C3	
V1	50.17	53.77	55.73	52.27	53.22
V2	56.60	52.70	55.03	51.87	54.78
V3	54.20	51.60	50.30	52.30	52.03
Average	53.66	52.69	53.69	52.14	

Note: Numbers that are not followed by notation in each treatment column indicate an insignificant effect.

Giving cocopeat and the response of several oil palm varieties did not have a significant effect. It can be seen in (Table 4), that from the treatment on the increase in chlorophyll in oil palm leaves, there was a different trend in the treatment given cocopeat, namely the C2 treatment with a mean of 53.69 and followed by a difference in C0 namely 53.66 and C1 which has an average leaf chlorophyll of 52.69, while the C3 treatment has an average leaf chlorophyll of 52.14.

For the treatment of several oil palm varieties, the effect was not significant, but if we look at the average oil palm chlorophyll data in (Table 4), there is a tendency that the treatment of several good oil palm varieties is V2, namely 54.78, followed by V1 53.22. and followed by V3 with leaf chlorophyll of 52.03.

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The interaction between the cocopeat soaking treatment and several oil palm varieties did not have a significant effect, but it can be seen in (Table 4), there was a tendency that the best combination was in the C0V2 treatment where the plant leaf chlorophyll was 56.60.

5. Wet Weight (g)

The results of the analysis showed that the comparative treatment of planting media had no significant effect on the base weight of oil palm seedlings at the age of 1-4 WAP . This can be seen in Table 5.

Table 5. Average Wet Weight of Oil Palm Seedlings (cm) at 14 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Variety	Cocopeat				Average
	C0	C1	C2	C3	
V1	13.60	12.33	13.49	13.54	13.24
V2	12.88	12.13	12.44	12.90	12.59
V3	13.13	11.81	12.84	13.73	12.88
Average	13.20	12.09	12.92	13.39	

Note: Numbers that are not followed by notation in each treatment column indicate an insignificant effect.

Giving cocopeat and the response of several oil palm varieties did not have a significant effect. It can be seen in (Table 5), that from the treatment of the weight of the base of oil palm, there was a different trend in the treatment of giving cocopeat, namely the C3 treatment, the average weight of the base of the plant was 13.39, and was followed by a difference. C0 is 13.20, C2 with an average of 12.92 and C1 which has a plant base weight of 12.09

For the treatment of several oil palm varieties, the effect was not significant, but if we look at the data on the average weight of base oil palm in (Table 5), there is a tendency that the treatment of several good varieties of oil palm is V1, namely 13.24, followed by V3 with a base weight of 12.83 and followed by V2 12.59.

The interaction between the cocopeat soaking treatment and several oil palm varieties did not have a significant effect, but it can be seen in (Table 5), there was a tendency that the best combination was in the C3V3 treatment where the plant base weight was 13.73.

6. Dry Weight (g)

The results of the analysis showed that the comparative treatment of planting media had no significant effect on the dry weight of oil palm seedlings at the age of 1-4 WAP . This can be seen in Table 6.

Table 6. Average Dry Weight of Oil Palm Seedlings (cm) at 14 WAP with Comparative Treatment of Cocopeat and Palm Oil Varieties.

Variety	Cocopeat				Average
	C0	C1	C2	C3	
V1	4.33	3.67	2.67	3.00	3.42
V2	3.33	2.00	3.33	2.67	2.83
V3	3.00	2.67	3.67	4.67	3.50
Average	3.56	2.78	3.22	3.44	

Description: Numbers that are not followed by notation in each treatment column shows no real effect.

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Giving cocopeat and the response of several oil palm varieties did not have a significant effect as can be seen in (Table 6), but there was a different trend in the treatment giving cocopeat, namely the C0 treatment, which was 3.56, and followed by C3 with an average of 3.44 and followed by a difference in C2 which had an average weight. plant dry weight was 3.22, while treatment C1 plant dry weight was 2.78.

For the treatment of several oil palm varieties, the effect was not significant, but if we look at the data on the average dry weight of oil palm seedlings in (Table 6), there is a tendency that the treatment of several good oil palm varieties is V3, namely 3.50, followed by V1, namely 3, 42 and followed by V2 with a plant dry weight of 2.83.

The interaction between the cocopeat soaking treatment and several oil palm varieties did not have a significant effect, but it can be seen in (Table 6), there was a tendency that the best combination was in the C3V3 treatment where the plant dry weight was 4.67.

DISCUSSION

Growth Response of Oil Palm Seedlings with Cocopeat Treatment as a Growing Media.

Cocopeat treatment of oil palm seedlings had a significant effect on the number of leaves. Meanwhile, growth in plant height, stem diameter, leaf chlorophyll, leaf area, wet and dry weight did not have a significant effect.

From the treatment of various types of cocopeat, it consists of 4 levels, namely C0 (top soil/control), C1 (top soil : cocopeat not soaked), C2 (top soil: cocopeat soaked in a bucket), C3 (top soil: cocopeat soaked in running water). Of the three types of cocopeat treatment used, the C3 treatment had a significant effect on the number of leaves. Where the cocopeat treatment as a planting medium showed that the number of leaves of oil palm seedlings treated with cocopeat soaked in running water was the best number of leaves, but the C3 treatment was not significantly different from the C2 treatment. The cocopeat soaking treatment used gave a significantly different response to the control (without cocopeat). It is suspected that the role of cocopeat from various treatments has a good influence on the composition of the planting medium for pre-nursing oil palm plants. Where the most ideal composition of planting media for nurseries is planting media with added organic materials, including Cocopeat treatment.

Cocopeat is a byproduct of the process of extracting coconut fiber fiber. According to Sari (2015) cocopeat has high lignin and cellulose content. Cocopeat has a pH of 5.2-6.8 and is very difficult to break down. The nutrient content contained in cocopeat is the macro and micro nutrients that plants need, including potassium, phosphorus, calcium, magnesium and sodium. Cocopeat can retain water content and chemical elements of fertilizer and neutralize soil acidity.

Growth Response of Oil Palm Seedlings from Several Varieties

Several oil palm varieties studied showed no significant effect on the growth of oil palm seedlings. The three varieties used have different genetic characteristics.

This is because V2 (DxP Yangambi) is an oil palm population from Africa which is widely used as a pisifera parent source of superior seeds. The PPKS oil palm varieties produced from this population are: DxP Yangambi, DxP PPKS 239, and Dxp PPKS 718. In general, this population has the advantage of relatively large bunch weights. With the character of large bunches, the varieties produced from this population can be planted in areas where harvesting power is limited, and planting areas that are relatively flat. Bunch production is very high, the number of bunches is very large, the size of the bunches is relatively small, the oil content in the bunches is very good, and it is suitable for planting in various areas.

Meanwhile, V3 (DxP Langkat) is the first variety assembled by PPKS from the results of the best recommendations from several pisifera populations. The pisifera parent is the result of a

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recommendation between pisifera Avros, Yangambi and Marihat which was crossed with the best Deli dura to produce a variety with the superior character of a relatively short rachis (compact palm) and a CPO potential of up to 8.3 tonnes/ha/yr. Apart from being suitable for planting in undulating and hilly areas, this variety can also start bearing fruit at the age of 22 months after planting. Relative growth of jagur, high bunch production, very high oil yield and can be planted in various areas.

Simalungun is an oil palm variety which is a variety produced from pisifera parents of pure SP540 descent which is only owned by PPKS. The varieties in this group consist of: DxP PPKS 540, DxP Simalungun and DxP AVROS. The superior characteristics of this variety are a quick starter and a fairly high percentage of mesocarp per fruit. With quite wide adaptability, this variety can be planted on various types of oil palm land (plain to undulating areas). Jagur growth, high bunch production, very high oil yield, begins to bear fruit very early, namely 22 months, and can be planted in various areas.

Giving Interaction Cocopeat as a Planting Media and Several Varieties of Palm Oil on Seedling Growth.

The interaction between cocopeat treatment and several oil palm varieties had no significant effect on all observed parameters. The best combination is in the C3V1 treatment (Cocopeat soaked in running water and the Simalungun variety). It is very likely that there is still tannin content in cocopeat. In this research, it is hoped that various kinds of soaking treatments in cocopeat can reduce the tannin content, because cocopeat contains quite high tannins.

According to Sari (2015), cocopeat will break down easily in the long term , so the benefits of cocopeat can last a long time. Cocopeat can retain water content and chemical elements of fertilizer and neutralize soil acidity. The nature of cocopeat which likes to hold water in the pores is beneficial because it will store liquid fertilizer so that the frequency of fertilization can be reduced and in cocopeat it also contains natural substances that are really needed by plants, high water absorption capacity, loosens the soil with a neutral pH, and supports root growth .

IV. CONCLUSION

1. The growth of several oil palm varieties had no significant effect on all treatment parameters.
2. The use of cocopeat had a significant effect on the number of leaves, but had no significant effect on plant height, leaf area , leaf chlorophyll, base weight and dry weight. Good growth was seen when cocopeat was soaked in C3 running water.
3. The interaction of cocopeat with several oil palm varieties had a significant effect on the number of leaves of oil palm seedlings, whereas it had no significant effect on the other treatments.

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