



ANALYSIS OF GROWTH AND PRODUCTION OF SOYBEAN (*Glycine max* (L) Merrill) BY APPLICATION OF NPK COMPOST AND PALM OIL EMPTY FLOW PLANTS

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Abstract

The research was carried out in Sei Kepayang Kanan Village, Sei Kepayang Subdistrict, Asahan Regency, North Sumatra Province with a height of ± 7 m above sea level with a flat topography. The study was conducted in March 2018 to May 2018. This research was conducted using a factorial randomized block design with 2 treatment factors and 3 replications. The first factor is empty Palm Oil Compost fertilizer with 4 levels, namely: TK0 = 0 kg / plot (control), TK1 = 1 kg / plot, TK2 = 2 kg / plot and TK3 = 3 kg / plot. The second factor is NPK administration with 3 levels namely N0 = No pruning, N1 = 0.015 g / plot and N2 = 0.03 g / plot. From the results of observations of NPK applications showed no significant effect on plant height aged 2, 4 and 6 MST, but had a significant effect on the number of branches per sample plant, number of filled pods per sample plant and production per plot. The NPK (N2) treatment showed the best effect on producing plant height (41.97 cm), number of branches per sample plant (1.52 branches), number of filled pods per sample plant (159.97 g), and production per plot (7.31 kg). The treatment of Palm Oil Empty Fruit Bunch Compost did not show any significant effect on plant height at ages 2, 4 and 6 MST, and also had a significant effect on the number of branches per sample plant, number of filled pods per sample plant and production per plot.

Keywords: NPK, Palm Oil Empty Fruit Bunch Compost Fertilizer, *Glycine Max.* (L) Meril.

A. Introduction

This was proved by an increase in national Soybean is the main food commodity in Indonesia after rice and corn, where processed products from soybeans such as tofu, tempeh, and soy sauce have become a favorite food for the people of Indonesia soybean consumption published by the Ministry



of Agriculture (KEMENTAN) in 2016 which states that national soybean consumption continues to increase every year, in 2015 the total national soybean consumption was 1,563,827.04 tons and experienced an increase in the year 2016 to be 2,486,775.94 tons, from the data soybean consumption in 2015 - 2016 has increased by 59%.

Soybean production in Asahan District in 2014 was around 11 tons while in 2015 it was around 115 tons, then in 2016 it was only around 23 tons, this shows a decrease of around 92 tons in the last year. Whereas in Sei Kepayang District in 2012 around 12 tons in 2013 were 3 tons, in 2014 there were 6 tons, in 2015 there were 3 tons while in 2016 there were only 2 tons, where from 2012 to 2016 soybean production in Sei Kepayang Sub-district experienced the decrease seems to be significant (Asahan District Agriculture Office, Asahan in Figures for 2016).

An important part of the cultivation business that supports the success of life and production of a plant is the problem of fertilization, its background is due to the decreasing soil fertility factor, so plants need to be given additional nutrients in the form of fertilizer. Organic fertilizers are fertilizers made from the rest of living things that are processed through the process of decomposition (decomposition) by decomposing bacteria such as empty palm fruit bunches compost (Harjono, 2000).

Fertile soil can not only be assessed from physical and chemical conditions, but also the content or effectiveness of the bodies that are in it. In the process of growth, soybean plants need nitrogen in sufficient quantities. To increase soybean production, it requires N, P, and K nutrients to meet the needs of growth, flower formation and pod filling (Pratama et al, 2017). Now on the market many NPK compound fertilizers are available. According to Sintaatmadja in Palobo et al (2013) NPK compound fertilizer, has a relatively high nutrient content and is quickly available to plants. The advantages compared to a single fertilizer are easier application, more complete and balanced nutrient content, more efficient use of labor and time, and easier procurement and storage. One of,

Provision of inorganic fertilizer needs to be balanced with organic fertilizer, to maintain the availability of nutrients and increase nutrient uptake in the soil. One of the forms of organic fertilizer that farmers are interested in is liquid organic fertilizer (POC). Liquid organic fertilizer (POC) is fertilizer that contains high C-Organic, macro and micro nutrients



(N, P, K, Ca, Mg, B, Zn, Cu, Mn, Co, Bo, Mo, Fe). This liquid organic fertilizer has several benefits including stimulating the growth and quality of root performance perfectly and increasing the development and growth of plants in total (Hamzah, 2014).

B. Purpose

1. Obtain information on growth and production of soybean plants (*Glycine max* (L) Merrill), on the NPK fertilizer application.
2. Obtain information on the growth and production of soybean (*Glycine max* (L) Merrill), on the provision of Oil Palm Empty Fruit Fertilizer.
3. Obtaining information on the growth and production of soybean (*Glycine max* (L) Merrill), on the application of the combination of Oil Palm Empty Fruit Bunch and NPK Fertilizer.

C. Hypothesis

1. There is an influence of NPK application on the growth and production of soybean plants.
2. There is the influence of the application of Palm Oil Empty Fruit Bunch Compost as well as soybean crop production
3. There is an interaction effect between NPK application and Oil Palm Empty Fruit Bunch Compost and on the growth and production of soybean plants.

D. Research Purpose

1. Theoretical Benefits

Research that starts from doubting a particular theory is called verification research. Doubt about a theory arises if the theory in question can no longer explain the actual events that are encountered. Testing of the theory is done through empirical research, and the results can reject, or confirm, or revise the relevant theory.

2. Practical benefits

On the other hand, research is also useful for solving practical problems. Almost all institutions in society, both government and private institutions, realize this benefit by placing research and development as an integral part of their organizations. Both of these



research benefits are a condition of conducting a study as stated in the research design.

II. METHODS

The study was carried out in Sei Kepayang Kanan Village, Sei Kepayang Subdistrict, Asahan Regency, North Sumatra Province with a flat topography at an altitude of ± 7 m above sea level with a flat topography. The study was conducted in March 2018 to May 2018.

The ingredients used consist of Anjasmoro Varieties soybean seeds, Palm Oil empty fruit bunches, NPK compost, Decis 2.5 EC 0.2% insecticide (Deltamethrin active ingredient) and Dithane M-45 Fungicide 0.2% (Active ingredients Mankozeb 80 WP), for tools used consisting of hoes and tripe to cultivate the soil, the meter as a measurement tool for observing parameters, sterile scissors and knives as pruning tools, bloating and hand sprayer as sprinklers, stationery, scales and calculators, treatment code boards, boards replication codes, sample plant plates and research title banners.

This analysis was compiled based on a factorial randomized block design (RBD) consisting of 2 treatment factors and 3 replications.

The first factor is Palm Oil (K) Empty Fruit Bunch Compost Fertilizer which consists of 4 (four) levels, namely:

TK0 = No treatment (control)

TK1 = 5 Tons / ha (1 kg / plot)

TK2 = 10 Ton / ha (2 kg / plot)

TK3 = 15 Tons / ha (3 kg / plot)

The second factor is the provision of NPK (L) consisting of 3 (three) levels, namely:

N0 = Without treatment

N1 = 150 g / ha (0.015 g / plot)

N2 = 300 g / ha (0.03 g / plot)

Plant parameters observed were plant height (cm), number of branches per sample plant (branch), number of filled pods per sample plant (fruit) and soybean production per plot (kg / m²).

C. Discussion

III. RESULTS AND DISCUSSION

A. Results



1. Plant Height (cm)

Observation data and analysis of variance in height of soybean plants aged 2, 4, and 6 MST can be seen in Appendix 7, 10, 13 and 9.12, and 15.

From the analysis of variance analysis, it can be seen that the application of empty Palm Oil Palm Bunch Compost showed no significant effect on soybean plant height at ages 2, 4 and 6 MST. The treatment of NPK showed no significant effect on age 2, 4 and 6 MST. The interaction of oil palm empty fruit bunches and NPK fertilizer compost also showed no significant effect on all ages observed. The results of the average different test of the influence of Palm Oil Empty Fruit Bunch Compost and NPK administration on the height of soybean plants aged 6 MST can be seen in Table 1 below.

Table 1. Average Difference Test Results Effect of Oil Palm empty fruit bunches and NPK fertilizer compost To Plant Height (cm) Soybeans Age 2, 4, and 6 MST.

Treat ment	Plant Height (cm)								
	2 weeks			4 weeks			6 weeks		
	x	5 %	1 %	x	5 %	1 %	x	5 %	1 %
TK0	8.6			19.0			36.6		
	2	a	A	0	a	A	4	a	A
TK1	9.1			20.8			41.9		
	5	a	A	8	a	A	2	a	A
TK2	9.3			19.4			41.5		
	9	a	A	4	a	A	1	a	A
TK3	8.9			20.2			41.0		
	3	a	A	2	a	A	4	a	A
N0	8.9			19.5			39.8		
	1	a	A	7	a	A	5	a	A
N1	9.0			19.8			39.0		
	1	a	A	4	a	A	1	a	A
N2	9,1			20.2			41.9		
	4	a	A	4	a	A	7	a	A
TK0N0	8.0			17.8			36.7		
	1	a	A	0	a	A	5	a	A
TK0N1	9.0			20.1			37.2		
	6	a	A	3	a	A	5	a	A



TK0N2	8.7			19.0			35.9		
	8	a	A	7	a	A	1	a	A
TK1N0	9.4			20.5			40.4		
	1	a	A	0	a	A	7	a	A
TK1N1	8.9			21.3			41.6		
	3	a	A	0	a	A	6	a	A
TK1N2	9,1			20.8			43.6		
	2	a	A	3	a	A	5	a	A
TK2N0	8.8			17.1			38.0		
	8	a	A	7	a	A	0	a	A
TK2N1	9.3			19.3			41.2		
	0	a	A	3	a	A	0	a	A
TK2N2	9.9			21.2			45.3		
	9	a	A	1	a	A	3	a	A
TK3N0	9.3			22.2			44.1		
	6	a	A	0	a	A	9	A	A
TK3N1	8.7			18.6			35.9		
	5	a	A	0	a	A	5	A	A
TK3N2	8.6			19.8			42.9		
	7	a	A	7	a	A	9	A	A

Note: Numbers followed by the same letter in the same row or column show no significant difference at 5% using the LSD Test.

From Table 1 it can be seen that the application of Palm Oil Empty Fruit Bunch Compost in the height of 2 MST age plants with 2 kg / plot (TK2) treatment has the highest plant height of 9.39 cm, not significantly different from the treatment of TK1, TK3 and TK0 as well TK1, TK3 and TK0 treatments are not significantly different from each other. The NPK application treatment with 0.03 g / plot (N2) treatment had the highest plant height of 9.14 cm, not significantly different from the treatment of N1 and N0, likewise between N1 and N0 were not significantly different from each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually the highest plant height was obtained in a combination of TK2N2 treatment, which was 9.99 cm.

The height parameters of plant age 4 MST with 2 kg / plot (TK1) treatment had plant height of 20.88 cm which were not significantly different from the treatments of TK3, TK2 and TK0 as well as the treatments



of TK3, TK2 and TK0 were not significantly different from each other. The NPK application treatment with 0.03 g / plot (N2) treatment had the highest plant height of 20.24 cm, not significantly different from the treatment of N1 and N0, likewise between N1 and N0 were not significantly different between each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually the largest plant height was obtained at a combination of TK3N0 treatment, which was 22.20 cm.

The plant height parameter at 6 MST with 1 kg / plot (TK1) treatment had the highest plant height of 41.92 cm, not significantly different from the TK2, and TK3 treatments, as well as the TK1 and TK0 treatments that differed significantly among each other. The NPK application treatment with 0.03 g / plot (N2) treatment had the highest plant height of 41.97 cm, significantly different from the N1 and N0 treatments, as well as between N1 and N0 were not significantly different from each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually the highest plant height was obtained in a combination of TK2N2 treatment, which was 45.33 cm.

2. Number of branches in the sample plant

From the analysis of variance analysis it can be seen that the application of Palm Oil Empty Fruit Bunch Compost shows a significantly different effect on the number of branches per soybean sample plant, the same thing also occurs in the NPK application treatment which shows the real effect on the number of branches per soybean sample crop . The interaction of oil palm empty fruit bunches compost and NPK application showed no significant effect on all ages observed.

The average difference test results of the influence of Palm Oil Empty Fruit Bunch compost and NPK application on the number of branches per soybean sample plant can be seen in Table 2 below.

Table 2. Average Difference Test Results of the Effect of Oil Palm Empty Fruit Bunch Compost Fertilizer and NPK Application on Number of Branches Per Sample Plant (branches) Soybeans.



K / L	TK0	TK1	TK2	TK3	Average
N0	0.60 a	1.33 a	1.27 a	1.87 a	1.27 c
N1	0.47 a	1.73 a	1.33 a	0.60 a	1.03 b
N2	.80 a	1.53 a	1.80 a	1.93 a	1.52 a
Average	0.62 b	1.53 a	1.47 a	1.47 a	KK = 31.50%

Note: Numbers followed by the same letter in the same row or column show no significant difference at the 5% level using the DMRT Test.

From Table 2 it can be seen that the application of Palm Oil Empty Fruit Bunch Compost with a 1 kg / plot (TK1) treatment has the highest number of branches per sample plant of 1.53 branches, not significantly different from the TK2, and TK3 treatments, as well as the TK1 and TK0 is significantly different from each other. The NPK application treatment with 0.03 g / plot (N2) treatment has the highest number of branches per sample plant that is 1.52 branches, significantly different from the N1 and N0 treatments, likewise between N1 and N0 are significantly different from each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually the largest number of branches per plant was obtained in the combination of TK3N2 treatment, which was 1.93 cm.

Effect of oil palm empty fruit bunch compost fertilizer application on the number of branches per soybean sample plant can be seen in the response curve of Figure 1 below.

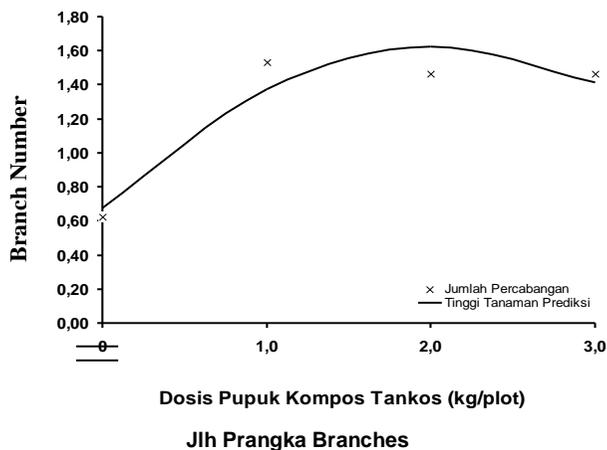


Figure 1. Response Curve of Palm Oil Empty Fruit Bunch Compost Fertilizer on the Number of Branching Soybeans.

Regression analysis of the influence of application of Palm Oil Empty Fruit Bunch Compost per plant sample of soybean obtained a linear regression curve with the equation $\hat{Y} = 0.6744 + 0.9300 K - 0.2278 TK^2$ with $R^2 = 0.90$ as can be seen in Figure 1 above.

The effect of NPK application treatment on the number of branches per soybean sample plant can be seen in the response curve of Figure 2 below.

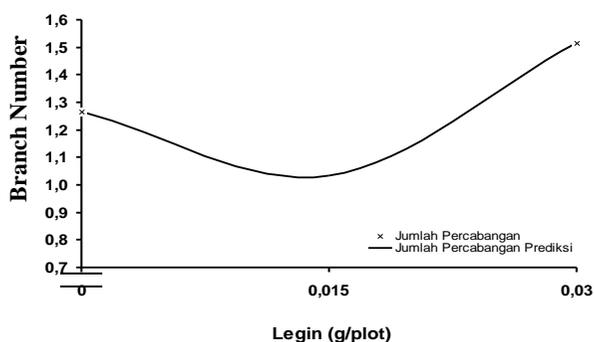


Figure 2. Response Curves of NPK Application to the Number of Branching Soybeans.



Regression analysis of the effect of NPK application on the number of branches per sample of soybean obtained cubic regression curve with the equation $\hat{Y} = 1.2667 - 39.44444 L + 1592.59 N^2$ with $R^2 = 1.0$ as can be seen in Figure 2 above.

3. Number of Pods Contained Per Plant Sample (fruit)

Observation data and analysis of variance in the number of pods contained per soybean sample plant can be seen in Appendix 19 and 21.

From the analysis of variance analysis, it can be seen that the application of Palm Oil Empty Fruit Bunch Compost shows a significantly different effect on the number of pods contained per soybean sample plant, the same thing also occurs in the NPK application treatment which shows the real effect on the number of pods containing per sample plant soybeans. The interaction of oil palm empty fruit bunches compost and NPK application showed no significant effect on all ages observed.

The results of the average different test of the influence of Palm Oil Empty Fruit Bunch compost and NPK application on the number of pods contained per soybean sample plant can be seen in Table 3 below.

Table 3. Results of Average Difference Test Effects of Oil Palm Empty Fruit Bunch Compost Fertilizer and NPK Application on Number of Pod Contains Per Soybean (fruit) Plant.

K / L	TK0	TK1	TK2	TK3	Average
N0	102.6 7 a	142.2 7 a	161.80 a	176.53 a	145.82 c
N1	126.2 0 a	149.0 7 a	167.07 a	180.07 a	155.60 b
N2	139.7 3 a	151.2 0 a	169.67 a	179.27 a	159.97 a
Average	122.8 7 d	147.5 1 c	166.18 b	178,62 a	KK = 8.28%

Note: Numbers followed by the same letter in the same row or column show no significant difference at 5% using the BNJ Test.



From Table 3 it can be seen that the application of Palm Oil Empty Fruit Bunch Compost with a 3 kg / plot (TK3) treatment has the highest number of pods per plant sample of 178.62, significantly different from the TK2, TK1 and TK0 treatments, as well as the TK2 treatment, TK1 and TK0 are significantly different from each other. The NPK application treatment with 0.03 g / plot (N2) treatment had the highest number of pods containing per plant which was 159.97 pieces, significantly different from the N1 and N0 treatments, as well as between N1 and N0 were significantly different between each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually the largest number of pods contained per plant sample was obtained in the TK3N1 treatment combination, which was 180.07 branches.

Effect of oil palm empty fruit bunches compost fertilizer on the number of pods per soybean sample plant can be seen in the response curve Figure 3.

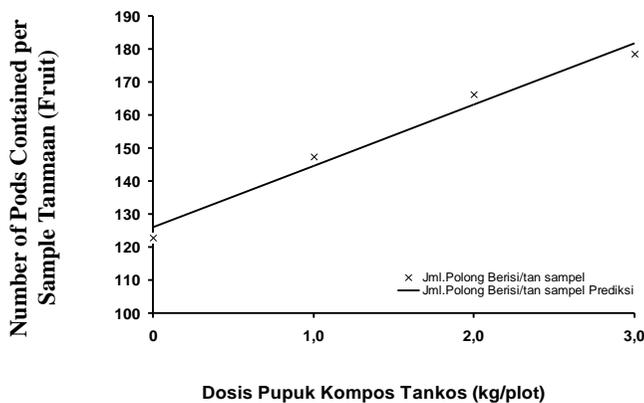


Figure 3. Response Curve of Oil Palm Empty Compost Fertilizer on the Number of Pod Contains Per Soybean Plant Sample.

Regression analysis of the effect of Oil Palm Empty Fruit Bunch Compost on the number of pods per soybean sample plant obtained a linear regression curve with the equation $\hat{Y} = 125.9044 + 18.5933 K$ with $r^2 = 0.99$ as can be seen in Figure 3 above.

The effect of NPK application treatment on the number of pods contained per soybean sample plant can be seen in the response curve in Figure 4 below.

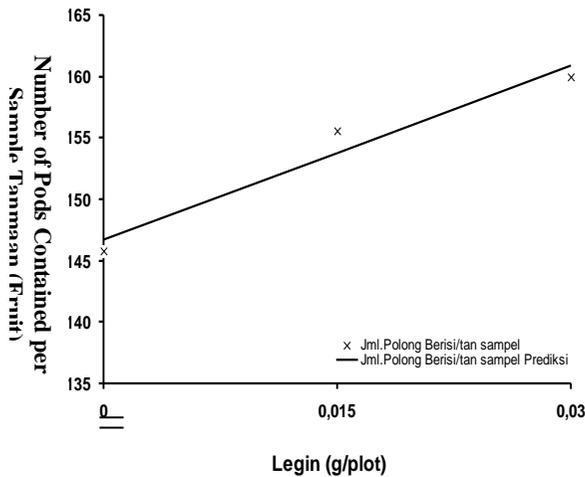


Figure 4. Response Curves Effect of NPK Application on the Number of Pods Contained Per Plant Soybean Samples

Regression analysis of the effect of NPK application on the number of pods contained per soybean crop obtained linear regression curves with the equation $\hat{Y} = 146.7194 + 471.66667 K$ with $r = 0.97$ as can be seen in Figure 4 above.

4. Soybean Production Per Plot (kg / m²)

From the analysis of variance analysis, it can be seen that the application of Palm Oil Empty Fruit Bunch Compost shows a significantly different effect on the production per soybean plot, the same thing happens in the NPK application treatment which shows a real effect on the production per soybean plot. The interaction of oil palm empty fruit bunches compost and NPK application showed no significant effect on all ages observed.

The average difference test results of the influence of Palm Oil Empty Fruit Bunch compost and NPK application on the production per soybean plot can be seen in Table 4 below.



Table 4. Results of Average Difference Test Effects of Oil Palm Empty Fruit Bunch Compost Fertilizer and NPK Application on production per plot (kg) of Soybeans.

K / L	TK0	TK1	TK2	TK3	Averag e
N0	5.52 a	6.46 a	6.97 a	8.01 a	6.74 c
N1	6,11 a	6.94 a	7,47 a	8.18 a	7,17 b
N2	6.25 a	6.97 a	7,84 a	8.19 a	7,31 a
Aver age	5,96 d	6.79 c	7,43 b	8,13 a	KK = 7.48%

Note: Numbers followed by the same letter in the same row or column show no significant difference at 5% using the BNJ Test.

From Table 4 it can be seen that the application of Palm Oil Empty Fruit Bunch Compost with a treatment of 3 kg / plot (TK3) has the highest production per plot of 8.13 kg, significantly different from the treatment of TK2, TK1 and TK0, as well as TK2, TK1 and TK0 is significantly different from each other. The NPK application treatment with 0.03 g / plot (N2) treatment has the highest production per plot of 7.31 kg, significantly different from the N1 and N0 treatments, as well as between N1 and N0 are significantly different from each other. The interaction of application of Oil Palm empty fruit bunches and NPK fertilizer shows no significant difference. Visually, the largest production per plot was obtained in a combination of TK3N2 treatment, which was 8.19 kg.

Effect of oil palm empty fruit bunches compost fertilizer on soybean per plot production can be seen in the response curve of Figure 5 below.

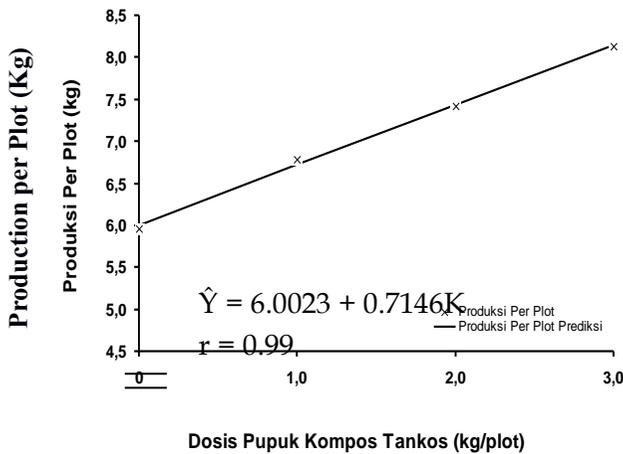


Figure 5. Response Curve of Oil Palm Empty Fruit Fertilizer Compost to Production Per Soybean Plots.

Regression analysis of the effect of Oil Palm empty fruit bunch compost on the production per soybean plot obtained a linear regression curve with the equation $\hat{Y} = 6.0023 + 0.7146 K$ with $r = 0.99$ as can be seen in Figure 5 above

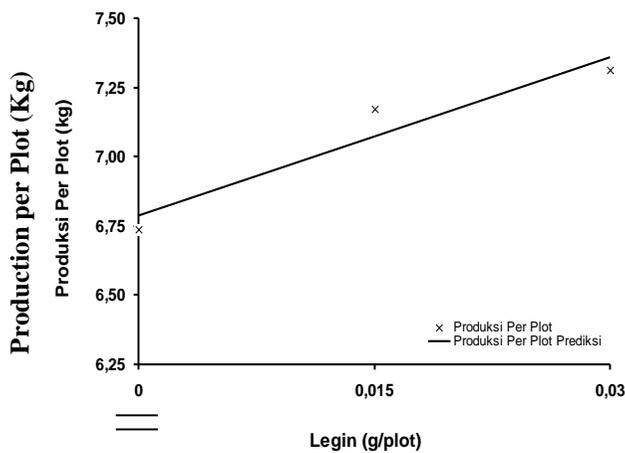


Figure 6. Response Curve Effect of NPK Application on Production Per Soybean Plots

Regression analysis of the effect of NPK application on the number of pods contained per soybean crop obtained linear regression curves with



the equation $\hat{Y} = 6.7879 + 19.0833 K$ with $r = 0.95$ as can be seen in Figure 5 above.

B. Discussion

1. Effect of Palm Oil Empty Fruit Bunch Compost on growth response and soybean crop production.

From the analysis of variance, it can be seen that the application of Palm Oil Empty Fruit Bunch Compost showed no significant effect on plant height 2, 4 and 6 MST, and significantly different effect on the number of branches per sample plant, number of filled pods per sample plant and production per soybean plot.

There was a very significantly different effect on vegetative and generative growth of soybean plants which were observed allegedly because of the higher doses of compost used for empty Oil Palm Bunches, the available nutrients would be high, so that the nutrients could be absorbed by soybean plants, thus the process of plant metabolism will become more good, so that it will spur the process of vegetative growth of plants which also influences generative growth.

Palm Oil Empty Fruit Compost is a result of fermentation of organic material with EM-4 technology that can be used as organic fertilizer that serves to fertilize the soil and increase the growth and production of soybean plants. In the parameter number of pods contained per plant sample shows TK3 production 178.62 g was significantly different from TK0 122.87 g where the difference between TK3 and TK0 ranged between 55.75 g (31%), while the production parameters per plot TK3 8.13 kg were significantly different from TK0 5.96 kg the difference between TK3 and TK0 ranged from 2.17 kg (27%).

Oil Palm empty fruit bunch composition has N (3.87%), C (33.98%) TK2O (1.048%) and P which is quite high (8.23%) (UISU Faculty of Agriculture soil science lab, 2008), which where P is needed by plants for vegetative growth. The P content is quite high in Empty Palm Oil Bunch Compostable to spur vegetative growth and soybean production. This is in accordance with the opinion of Novizan (2005) explains that in the phosphorus plant gives a very variable influence through activities such as; stimulates plant growth, cell division and fat formation, stimulates the formation of flowers, fruits and seeds, and even accelerates fruit ripening.



Furthermore Syarief (1985) said that sufficient nutrients are available to be able to spur plant height, stimulate the growth of the root system, increase production yields, and increase leaf growth so as to enhance the photosynthesis process.

The influence of oil palm empty fruit bunch compost application on plant height, number of branches per sample plant, number of filled pods per sample plant and production per plot due to oil palm empty fruit bunch compost fertilizer contains several benefits for plants including; improve the physical properties of the soil so that it remains loose, water supply in the soil so that root penetration in the soil develops well, adds essential nutrients both macro and micro which are needed by plants, increases the activity of beneficial soil microorganisms and has a positive residual effect, so that plants that planted in the following season still good growth and productivity.

Nutrient K in plants in the form of ions (K^+), this makes the K nutrient car is in the body of the plant (easy to move), so that the K nutrient plays a role to stimulate the translocation of photosynthesis from the leaves to other parts. The accumulation of photosynthates in the leaves inhibits photosynthesis, because removal from the leaves can maintain a high rate of photosynthesis (Supandie, 1997).

2. Effect of NPK application on growth response and soybean crop production

From the analysis of variance it can be seen that the NPK application showed no significant effect on plant height at ages 2, 4 and 6 MST, as well as significantly affected the number of branches per sample plant, number of pods contained per sample plant and production per soybean plot.

The influence was not significantly different for plant height at ages 2, 4 and 6 MST due to the treatment the rhizobium bacteria had not developed well by itself because the root nodules were still very little or none at all. While the effect was significantly different on the number of branches, the number pods containing per plant sample and per plot production are thought to be caused by having grown more root nodules containing rhizobium bacteria that will conduct symbiosis with soybean plants so that plants can utilize nitrogen from the air.



Soybean plants can bind Nitrogen (N₂) in the atmosphere through the activity of Nitrogen-binding bacteria, namely *Rhizobium japonicum*. This bacterium forms in the roots of plants which are named nodules or nodules. The presence of *Rhizobium japonicum* in the soil is already there because the land is planted with soybeans or deliberately added to the soil. Nodules or nodules of soybean plants can generally bind nitrogen from the air at the age of 10-12 days after planting, depending on soil environmental conditions and temperature.

According to Lamina, 2002. Bintil will be formed by *Rhizobium japonicum* when the soybean plants are still young ie after the hair root is at the main root or at the root of the branch. Root nodules with green mass are not active in nitrogen fixation while red color is active in nitrogen fixation. In soils that already contain *Rhizobium* bacteria will form nodules about 15-20 days after planting.

In the production parameter the number of pods contained per plant sample shows the

1. The effect of the interaction between the application of Palm Oil Empty Fruit Bunch Compost and NPK on growth response and soybean crop production .

From the analysis of variance, it can be seen the effect of the interaction between the application of Palm Oil Empty Fruit Bunch Compost and NPK showed no significant effect on all parameters at all plant ages observed, both vegetative growth and generative growth of soybean plants.

In addition, nutrient absorption from the soil to plants is influenced by various factors, including: the genetic characteristics of plants, climate, soil, and fertilizer application techniques. Interaction is not only always beneficial, but there are times when it can reduce the growth rate.

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusion

1. Oil Palm Empty Fruit Bunch Compost Application shows no significant effect on plant height at ages 2, 4 and 6 MST, and significantly affect the number of branches per sample plant, number of pods contained



- per sample plant and production per plot. The treatment of Oil Palm Empty Fruit Bunch Compost (TK1) showed the best effect on the parameters of the number of branches per sample plant (1.53 branches), while the treatment of Oil Palm empty Bunch compost as much as 15 tons (TK3) showed the best effect on the parameter number of pods containing per sample plant (178.62 g) and production per plot (8.13 kg).
2. Treatment of NPK application shows no significant effect on plant height at ages 2, 4 and 6 MST, but has a significant effect on the number of branches per sample plant, number of filled pods per sample plant and production per plot. The NPK (N2) application treatment showed the best effect, the number of filled pods per sample plant (159.97 g), and the production per plot (7.31 kg).
 3. Interaction of Oil Palm empty fruit bunch and NPK treatment compost showed no significant effect on all parameters and all ages observed. But visually the combination of TK3N2 treatment showed the highest production per plot, which was 8.19 kg.

B.Suggestions

Further research needs to be done at different places about the response of the growth and production of soybean plants to the application of Oil Palm empty fruit bunches and NPK compost at the same dose, in order to obtain better accuracy and obtain optimal growth and crop production.

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