

Response of Growth and Production of Soybean Varieties Edamame (*Glycine max* L. Meril) To Super Compost Fertilizer and POC JST

Ade Fipriani Lubis¹ , Turi Handayani² , Vanny Erlangga³

¹ Study Program Teaching Staff Agrotechnology, Faculty Asahan University Agriculture

² Study Program Students Agrotechnology, Faculty Asahan University Agriculture

³ Study Program Students Agrotechnology, Faculty Asahan University Agriculture

Correspondent Email: ade.fipriani@gmail.com

ABSTRACT

This research was conducted at the Experimental Field of the Faculty of Agriculture, Asahan University (UNA) Kisaran, Asahan Regency, North Sumatra, in February - April 2022. This study was arranged based on a factorial randomized block design (RBD) with 2 treatment factors and 3 replications. The first factor was the treatment of super compost (K) with 3 levels, namely K₀ = 0 tons/ha (control), K₁ = 5 tons/ha (0.94 kg/plot), K₂ = 10 tons/ha (1.88 kg/plot). Rhizobium Biological Fertilizer per 250 g of soybean seeds. The second factor is the concentration of JST POC (J) with 4 levels, namely J₀ = 0 ml/litre of water/plot, J₁ = 15 ml/litre of water/plot (1.5%), J₂ = 30 ml/litre of water/plot (3%), J₃ = 45 ml/litre of water/plot (4.5%). The results showed that the treatment of compost had a significant effect on the concentration of POC ANN (J), which significantly affected the height of plants 3 weeks after transplanting, the number of branches 3 weeks after transplanting, the number of filled pods per sample plant, pod production per sample, and pod production per plot. The best plant height 3 weeks after transplanting at a dose of 1.88 kg of super compost (K₂) is 30.73 cm, the number of branches aged 3 weeks after transplanting is best at a dose of 1.88 kg of super compost (K₂), i.e. 8.40 branches, the best number of filled pods per sample plant at a dose of 1.88 kg of super compost (K₂) is 50.53 pods, the best pod production per sample is at a dose of 1.88 kg of super compost (K₂) i.e. 31.43 g, the best product per plot at the dose of super compost (K₂) is 0.30 kg. POC ANN concentration treatment (J) significantly affected plant height 3 weeks after transplanting, number of branches aged 3 weeks after transplanting, number of filled pods per sample plant, pod production per sample, and pod production per plot. The best plant height at 3 weeks after transplanting with POC ANN treatment with a concentration of 4.5% (J₃) is 29.23 cm, and the best number of branches aged 3 weeks after transplanting is best with POC ANN treatment with a concentration of 4.5% (J₃) namely 7.81 branches, the best number of filled pods per sample plant with POC ANN concentration of 4.5% (J₃), namely 48.76 pods, the best pod production per sample with POC ANN treatment of 4.5% (J₃) namely 29.89 g and the best production per plot with POC ANN treatment with a concentration of 4.5% (J₃) is 0.31 kg. The interaction of super compost fertilizer and POC ANN concentrations did not affect all parameters of the edamame soybean variety

Keywords: *Edamame, Super Compost, POC JST*

INTRODUCTION

Soybean (*Glycine max* L. Meril) is a food commodity that provides vegetable protein for the community. According to Kartahadimaja et al. (2010), apart from being consumed in the form of fresh fruit (boiled soybeans), edamame also has better quality processed products than ordinary soybeans, such as tofu, which has a 15% higher yield with better colour and taste quality than ordinary soybeans. The quality of tempeh and milk from edamame has a better taste and smell than ordinary soybeans. Other advantages of edamame seeds are larger seeds, sweeter taste and texture more gentle compared to peanut soya bean normal.

Peanut Edamame soybeans are also rich in various nutrients. These green soybeans are an excellent source of protein, iron and calcium. In addition, edamame is also gluten-free, low in calories, and contains no cholesterol. That's why these nuts can be a good snack and can give benefit health (Adisarwanto, 2008).

Consuming food soya beans such as edamame may reduce the risk of several age- and lifestyle-related conditions, as well as improve overall health. The following are the health benefits of edamame: preventing age-related brain diseases, preventing cardiovascular disease, reducing the risk of breast cancer and prostate cancer, depression and good for diabetes (Adie & Krisnawati, 2007).

Edamame is a plant that was cultivated in China in 200 BC as a medicinal plant. Then, edamame began to be marketed in Japan in 972 AD. With the growing trade between countries in the 19th century, edamame began to spread to various parts of the trade destination countries, including Japan, Korea, India, Australia, America and Indonesia (Alfurkon, 2014).

Liquid organic fertilizers are mostly applied through the leaves or liquid foliar fertilizers that contain essential macro and micronutrients. Liquid organic fertilizer has several benefits, including encouraging and increasing the formation of leaf chlorophyll and the formation of root nodules in Leguminosae plants, thus increasing the photosynthetic ability of plants and absorbing nitrogen from the air, which can increase plant vigour so that plants become strong and strong, increase plant resistance. Against drought, weather stress, and attacks by pathogens that cause disease, stimulate the growth of production branches, increase the formation of flowers and ovaries, and reduce the fall of leaves, flowers and ovaries (Nurlisan & Yoseva, 2013).

Jamu Bumi is a Complete Liquid Organic Fertilizer which is great for all types of plants because Jamu Bumi contains many nutritional elements that plants need. Supported by proper tillage, sufficient compost application and proper application of earth herbs, satisfactory results will be obtained.

METHOD

This research was carried out in the Experimental Field of the Faculty of Agriculture, Asahan University (UNA) Kisaran, Asahan Regency, North Sumatra Province, with an altitude of ± 17 m above sea level. The research was carried out from February 2022 to April 2022.

This study was arranged based on a factorial randomized block design (RBD) with 2 treatment factors and 3 replications. The first factor was the treatment of super compost (K) with 3 levels, namely K₀ = 0 tons/ha (control), K₁ = 5 tons/ha (0.94 kg/plot), K₂ = 10 tons/ha (1.88 kg/plot). Rhizobium Biological Fertilizer per 250 g of soybean seeds. The second factor is the concentration of JST POC (J) with 4 levels, namely J₀ = 0 ml/litre of water/plot, J₁ = 15 ml/litre of water/plot (1.5%), J₂ = 30 ml/litre of water/ plot (3%), J₃ = 45 ml/litre of water/plot (4.5%).

FINDING AND DISCUSSION

Plant height (cm)

From the results of the analysis of variance, it can be seen that the treatment of super composting showed no significant effect on plant height (cm) of soybeans of the Edamame variety aged 1 week after transplanting and had a significant effect at the age of 3 weeks after transplanting. The POC ANN concentration treatment showed no significant effect on plant height (cm) of Edamame soybean varieties aged 1 week after transplanting and had a significant effect on 3 weeks after transplanting. The interaction of super compost fertilizer and ANN POC concentration showed no significant effect.

The results of the mean difference test on the effect of super compost fertilizer and JST POC concentration on plant height (cm) of Edamame soybean variety aged 3 weeks after transplanting can be seen in Table 1 below.

Table 1. Results of Mean Difference Test of Effect of Super Compost Fertilizer and JST POC Concentration on Plant Height (cm) Edamame Soybean Variety Age 3 Weeks After Transplanting

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	23,17 a	24.08a	25.00 a.m	26.50a	24.69c
K ₁	25.83 a	27.75a	28.60 a	29.02a	27.80b
K ₂	28.83 a	30,42 a	31.48 a	32,17 a	30.73 a
Average	25.94d	27.42c	28.36 b	29,23 a	KK = 8.13%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNJ test.

In Table 1 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed a plant height of up to 30.73 cm, significantly different from the treatment of super compost with a dose of 0.94 kg (K₁) namely 27, 80 cm, significantly different from without super compost (K₀) treatment , which is 24.69 cm.

From the treatment of POC ANN concentrations, treatment with a concentration of 4.5% (J₃) showed plant height, namely 29.23 cm, significantly different from the concentration of 3% (J₂), namely 28.36 cm, significantly different from a concentration of 1.5 % (J₁) which is 27.42 cm and significantly different without POC ANN (J₀) which is 25.94 cm. The interaction of super compost fertilizer with ANN POC concentration showed no

significant effect. Visually, plant height (cm) was obtained in the $K_2 J_3$ treatment combination, namely 32.17 cm.

The response of applying super compost to the height of soybean plants of the Edamame variety aged 3 weeks after transplanting resulted in a linear regression analysis with the equation $\hat{Y} = 24.718 + 0.3551K$ with $r = 0.99$ and can be seen in Figure 1 below.

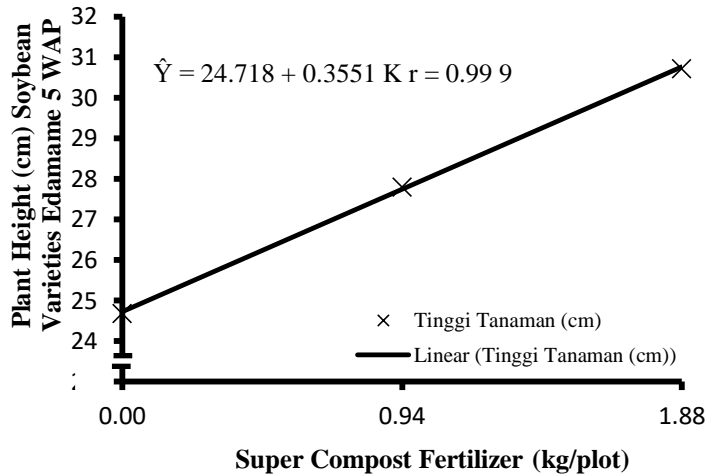


Figure 1. Response Curve of Applying Super Compost to Plant Height (cm) of Edamame Soybean Variety 3 Weeks After Transplanting.

The response of POC ANN concentrations to the height of soybean plants of the Edamame variety aged 3 weeks after transplanting resulted in a linear regression analysis with the equation $\hat{Y} = 26.118 + 0.072J$ with $r = 0.996$ which can be seen in Figure 2 below.

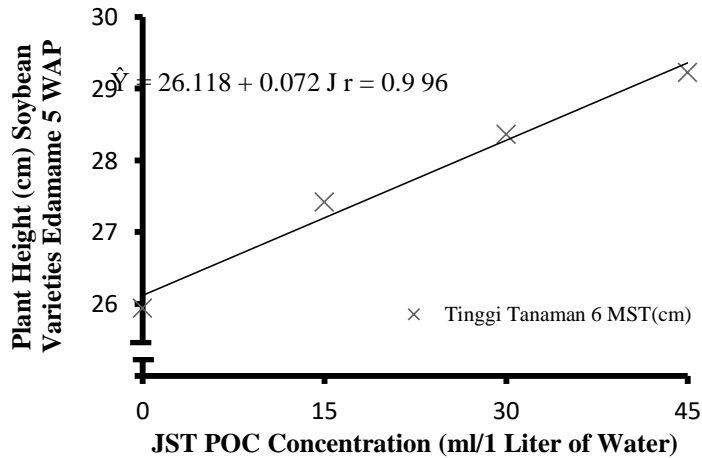


Figure 2. Response Curve of ANN POC Concentration to Plant Height (cm) of Edamame Soybean Variety Age 3 Weeks After Transplanting.

Number of branches (branches)

From the results of the analysis of variance, it can be seen that the treatment with super compost fertilizer showed no significant effect on the number of branches (branches) of soybean varieties of Edamame age 1 week after transplanting and had a significant effect on the age of 3 weeks after transplanting. The POC ANN concentration treatment showed no significant effect on the number of branches (branches) of the Edamame soybean variety aged 1 week after transplanting and had a significant effect on the age of 3 weeks after transplanting. The interaction of super compost fertilizer and ANN POC concentration showed no significant effect.

The results of the mean difference test on the effect of super compost fertilizer and JST POC concentration on the number of branches (branches) of the Edamame variety soybean aged 3 weeks after transplanting can be seen in Table 2 below.

Table 2. Results of the Mean Difference Test on the Effect of Super Compost Fertilizer and JST POC Concentration on the Number of Branches (branches) of Edamame Soybean Variety Age 3 Weeks After Transplanting

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	4,17 a	4.58 a	5.42 a	6.50 a	5.17 c
K ₁	5.83 a	6,67 a	7.08a	7.83 a	6.85b
K ₂	7,67 a	8.08a	8.75a	9.08a	8.40a
Average	5.89 d	6,44 c	7.08 b	7.81 a	KK = 9.66%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNJ test.

In Table 2 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed the highest number of branches, namely 8.40 branches, significantly different from the treatment of super compost with a dose of 0.94 kg (K₁) namely 6.85 branches, significantly different from without super compost (K₀) treatment, namely 5.17 branches.

From the POC ANN concentration treatment, the treatment with a concentration of 4.5% (J₃) showed the highest number of branches, namely 7.81 branches, significantly different from a concentration of 3% (J₂) namely 7.08 branches, significantly different from a concentration of 1.5% (J₁) which is 6.44 branches and significantly different without the addition of ANN POC (J₀) namely 5.89 branches. The interaction of super compost with ANN POC concentrations showed no significant effect. Visually, the number of branches obtained in the K₂J₃ treatment combination was 9.08 branches.

The response of applying super compost to the number of branches of soybean variety Edamame aged 3 weeks after transplanting resulted in a linear regression analysis with the equation $\hat{Y} = 5.191 + 1.7176K$ with $r = 0.99$ and can be seen in Figure 3 below.

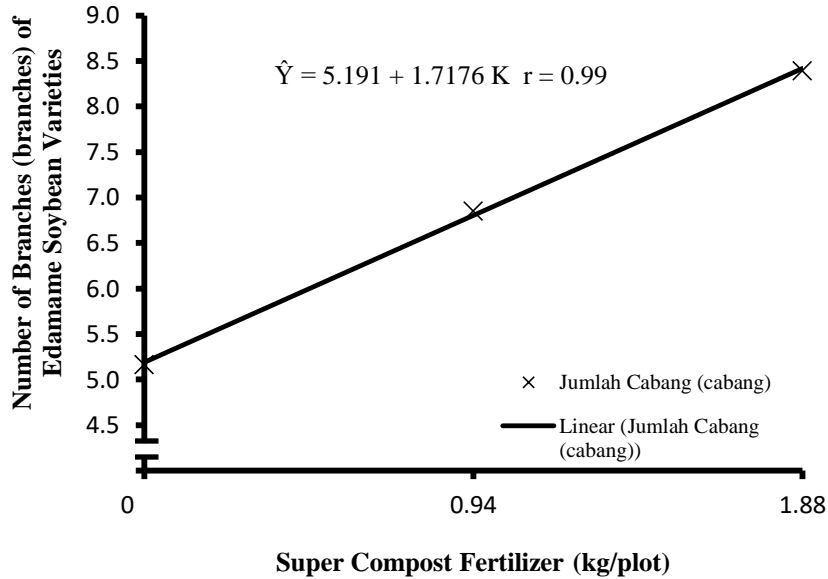


Figure 3. Response Curve of Applying Super Compost Fertilizer to the Number of Branches (branches) of Edamame Soybean Variety Age 3 Weeks After Transplanting.

The response of ANN POC concentration to the number of branches of soybean variety Edamame aged 3 weeks after transplanting resulted in a linear regression analysis with the equation $5.4872 + 0.0426J$ with $r = 0.99$ and can be seen in Figure 4 below.

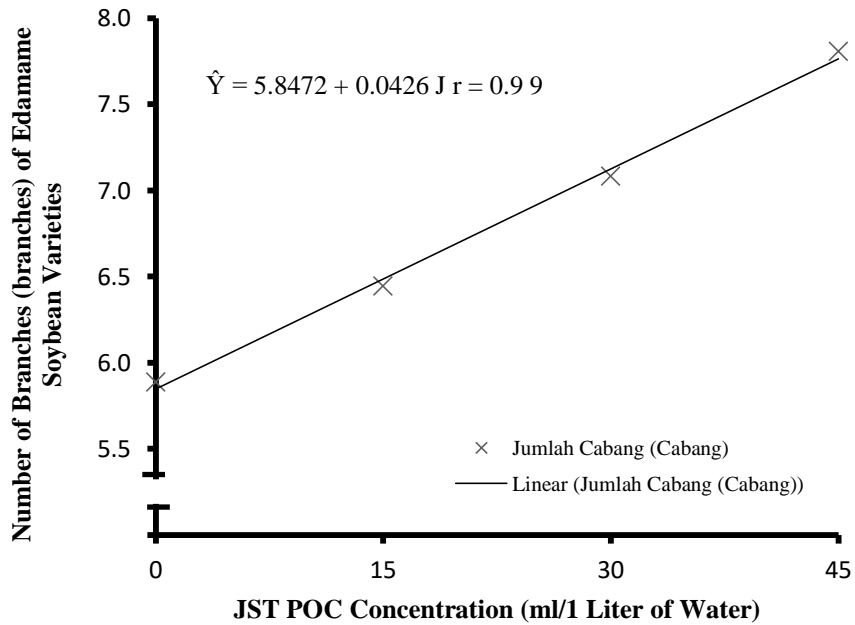


Figure 4. Response Curve of Concentration of POC ANN to the Number of Branches (branches) of Edamame Soybean Variety Age 3 Weeks After Transplanting.

Flowering Age (HST)

From the results of the analysis of variance, it can be seen that the treatment with super compost fertilizer showed no significant effect on the flowering age of soybeans of the Edamame variety. The POC ANN concentration treatment showed no significant effect on the flowering age of Edamame variety soybeans. The interaction of super compost fertilizer and ANN POC concentration showed no significant effect on flowering time.

The results of the mean difference test on the effect of super compost fertilizer and JST POC concentration on the flowering age (HST) of Edamame variety soybeans can be seen in Table 3 below.

Table 3. Results of the Mean Difference Test of the Effect of Super Compost Fertilizer and JST POC Concentration on Flowering Age (HST) of Edamame Soybean Varieties

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	30.00 a.m	30.00 a.m	30.00 a.m	28.63 a	29.66 a
K ₁	30.00 a.m	26.33 a	29.53 a	28.77 a	28.66 a
K ₂	30.00 a.m	27.50a	28.30a	27.73 a	28.38 a
Average	30.00 a.m	27.94 a	29,28 a	28.38 a	KK = 5.76%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNJ test.

In Table 3 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed the fastest flowering age, namely 28.36 days, not significantly different from the super compost fertilizer treatment with a dose of 0.94 kg (K₁), namely 28.66 days, not significantly different from without super compost (K₀) treatment, namely 29.66 days.

From the POC ANN concentration treatment, treatment with a concentration of 1.5% (J₁) showed the fastest flowering age, namely 27.94 days, not significantly different from 4.5% concentration (J₃) namely 28.38 days, not significantly different with a concentration of 3.0% (J₂) which is 29.28 days and not significantly different without the administration of POC ANN (J₀) which is 30.00 days. The interaction of super compost fertilizer with POC ANN concentrations showed no significant effect. Visually, the fastest flowering age was obtained in the K₂J₃ treatment combination, namely 27.73 days.

Number of pods per sample plant (fruit)

From the results of the analysis of variance, it can be seen that the treatment with super compost fertilizer showed a very significant effect on the number of pods per plant of the Edamame variety soybean sample. The POC ANN concentration treatment showed a very significant effect on the number of pods per plant of the Edamame variety soybean samples. The interaction of super compost fertilizer and ANN POC concentration showed no significant effect on the number of pods per sample plant.

The results of the mean difference test on the effect of super compost fertilizer and JST POC concentration on the number of pods per sample plant (fruit) of soybean varieties of the Edamame variety can be seen in Table 4 below.

Table 4. Results of the Mean Difference Test on the Effect of Super Compost Fertilizer and JST POC Concentration on the Number of Pods per Sample Plant (fruit) of Edamame Soybean Variety Age 3 Weeks After Transplanting

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	34.07a	33.87 a	34.83 a	40,20 a	35.74c
K ₁	35.50a	36.50a	37.63 a	46.53 a	39.04b
K ₂	41.30a	46.07a	55.20 a	59.53 a	50,53 a
Average	36.96d	38.81c	42.56b	48.76 a	KK = 9.94%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNJ test.

In Table 4 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed the highest number of pods per sample plant, namely 50.53 fruit, significantly different from the super compost fertilizer treatment with a dose of 0.94 kg (K₁) namely 39.04 fruit, significantly different from without super compost (K₀) treatment, namely 35.74 fruit.

From the POC ANN concentration treatment, the treatment with a concentration of 4.5% (J₃) showed the highest number of pods per sample plant, namely 48.76 pods, significantly different from the 3% concentration (J₂) ie 42.56 pods, significantly different from the concentration 1.5% (J₁) which is 38.81 pieces and significantly different without the provision of POC ANN (J₀) which is 36.96 pieces. The interaction of super compost with ANN POC concentrations showed no significant effect. Visually, the highest number of pods per sample plant was obtained in the K₂J₃ treatment combination, namely 48.76 pods.

The response of super compost fertilizer to the number of pods per plant of the Edamame variety soybean sample resulted in a linear regression analysis with the equation $\hat{Y} = 35.742 + 0.8696K$ with $r = 1$ and can be seen in Figure 5 below.

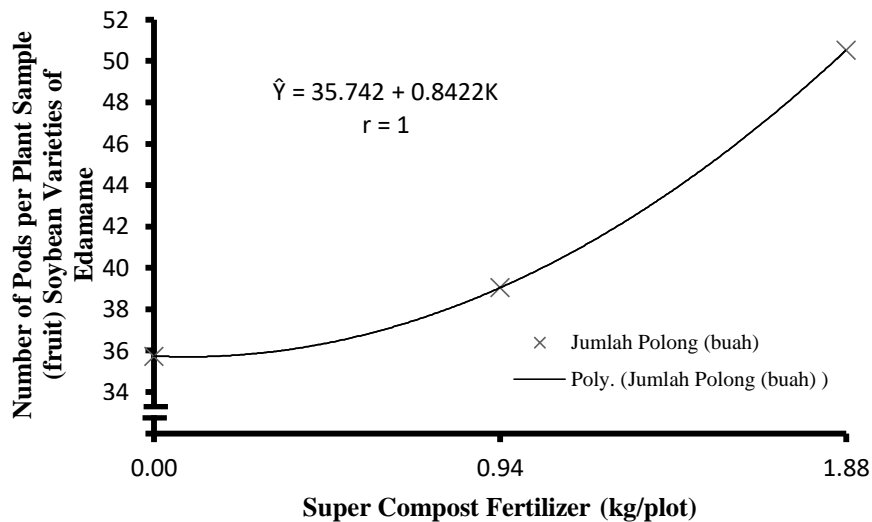


Figure 5. Response Curve of Applying Super Compost Fertilizer to the Number of Pods per Plant Sample (fruit) of Edamame Soybean Variety.

The response of POC ANN concentrations to the number of pods per sample plant (fruit) of the Edamame variety yielded a linear regression analysis with the equation $\hat{Y} = 36.984 + 0.261J$ with $r = 0.99$ and can be seen in Figure 6 below.

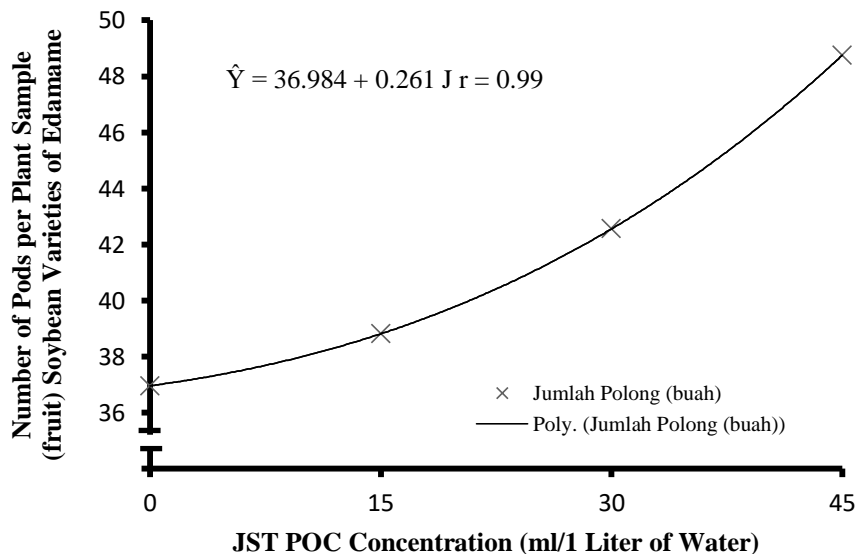


Figure 6. Response Curve of Concentration of ANN POC to Number of Pods per Sample Plant (fruit) of Soybean Varieties of Edamame.

Pod production per sample plant (g)

From the results of the analysis of variance, it can be seen that the treatment of super composting showed a very significant effect on pod production per plant of the Edamame soybean sample. The POC ANN concentration treatment showed a very significant effect on the pod production per plant of the Edamame soybean sample. The

interaction of super compost fertilizer and ANN POC concentration showed no significant effect on pod production per sample plant .

The results of the mean difference test on the effect of super compost fertilizer and POC ANN concentrations of pod production per sample plant (g) of Edamame variety soybeans can be seen in Table 5 below.

Table 5. Results of Mean Difference Test of Effect of Super Compost Fertilizer and JST POC Concentration on Pod Production per Sample Plant (g) Edamame Soybean Variety

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	21.07a	22.73 a	23.40 a	23.93 a	22.78c
K ₁	23.63 a	24.87 a	28.40 a	32.53 a	27,36 b
K ₂	29.07a	30.77 a	32.70 a	33,20 a	31.43 a
Average	24.59d	26.12 c	28,17 b	29.89a	KK = 8.32%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNJ test.

In Table 5 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed the highest pod production per sample plant , namely 31.43 g, significantly different from the treatment of super compost with a dose of 0.94 kg (K₁) which is 27.36 g, significantly different from that without super compost (K₀) treatment which is 22.78 g.

From the treatment of POC ANN concentrations, treatment with a concentration of 4.5% (J₃) showed the highest pod production per sample plant , namely 29.89 g , significantly different from the concentration of 3% (J₂), namely 28.17 g, significantly different from the concentration 1.5% (J₁) which is 26.12 g and significantly different without the addition of ANN POC (J₀) which is 24.59 g. The interaction of super compost with ANN POC concentrations showed no significant effect. Visually, the highest pod production per sample plant was obtained in the K₂J₃ treatment combination , namely 33.20 g.

The response of super compost fertilizer to pod production per plant of the Edamame soybean sample produced a linear regression analysis with the equation $\hat{Y} = 22.867 + 4.601K$ with $r = 0.99$ and can be seen in Figure 7 below.

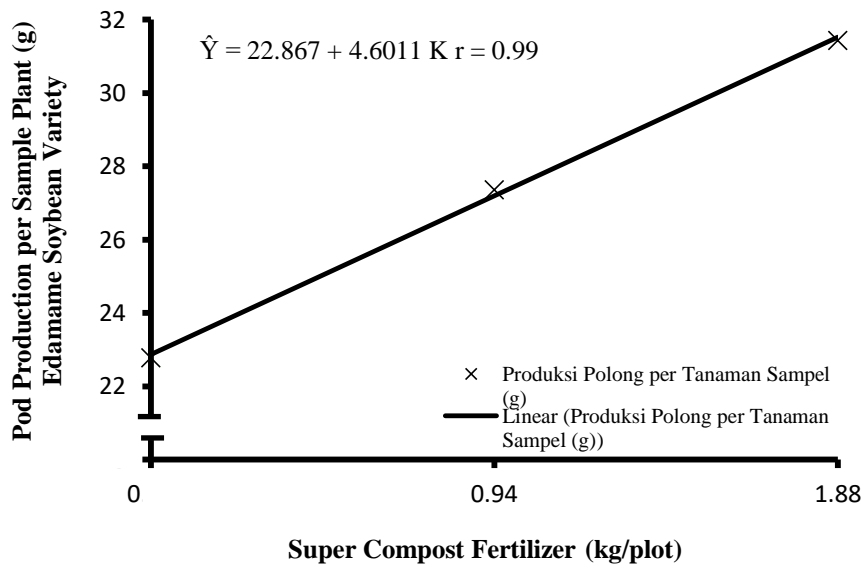


Figure 7. Response Curve of Applying Super Compost Fertilizer to Pod Production per Plant Sample (fruit) of Edamame Soybean Variety.

The response of ANN POC concentration to pod production per sample plant (g) of Edamame soybean variety resulted in a linear regression analysis with the equation $\hat{Y} = 24.5 + 0.1196J$ seen in Figure 8 below.

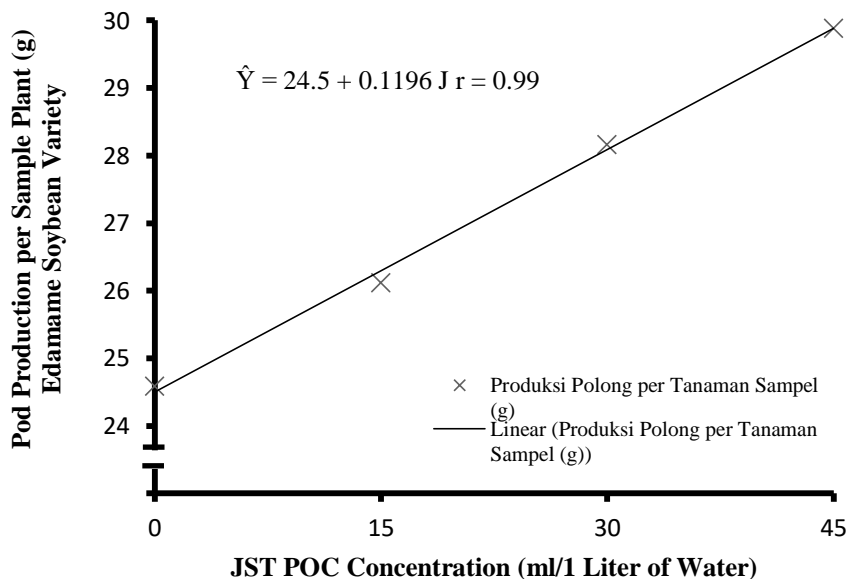


Figure 8. Response Curve of ANN POC Concentration on Pod Production per Sample Plant (g) Edamame Soybean Variety.

Pod production per plot (kg)

From the results of the analysis of variance it can be seen that the treatment of super composting showed a significant effect on pod production per plot of Edamame soybean variety. POC ANN concentration treatment showed a very significant effect on pod production per plot of Edamame soybean variety. The interaction of super compost fertilizer and ANN POC concentration showed no significant effect on pod production per plot .

The results of the mean difference test on the effect of super compost fertilizer and POC ANN concentrations of pod production per plot (kg) of Edamame variety soybeans can be seen in Table 6 below.

Table 6. Results of Mean Difference Test Effect of Super Compost Fertilizer and JST POC Concentration on Pod Production per Plot (kg) Edamame Soybean Variety

K/J	J ₀	J ₁	J ₂	J ₃	Average
K ₀	0.18a	0.19a	0.21a	0.29a	0.22c
K ₁	0.19a	0.28a	0.27a	0.29a	0.26b
K ₂	0.26a	0.27a	0.32a	0.35a	0.30a
Average	0.21d	0.25c	0.27b	0.31a	KK = 16.57%

Note: Numbers followed by different letters in the same column and row show significantly different at the 5% level based on the BNT test.

In Table 6 it can be seen that the treatment of super compost with a dose of 1.88 kg (K₂) showed the highest production of pods per plot , namely 0.30 kg, significantly different from the treatment of super compost with a dose of 0.94 kg (K₁) ie 0.26 kg, significantly different from without super compost (K₀) treatment, namely 0.22 kg.

From the treatment of POC ANN concentrations, the treatment with a concentration of 4.5% (J₃) showed the highest pod production per plot , namely 0.31 kg , significantly different from the concentration of 3% (J₂), namely 0.27 kg, significantly different from the concentration 1.5% (J₁) which is 0.25 kg and significantly different without the addition of POC JST (J₀) which is 0.21 kg. The interaction of super compost with ANN POC concentrations showed no significant effect. Visually, the highest pod production per plot was obtained in the K₂J₃ treatment combination , namely 0.35 kg.

The response of super compost fertilizer to pod production per plot of Edamame soybean variety resulted in a linear regression analysis with the equation $\hat{Y} = 0.2196 + 0.0421K$ with $r = 0.99$ and can be seen in Figure 9 below.

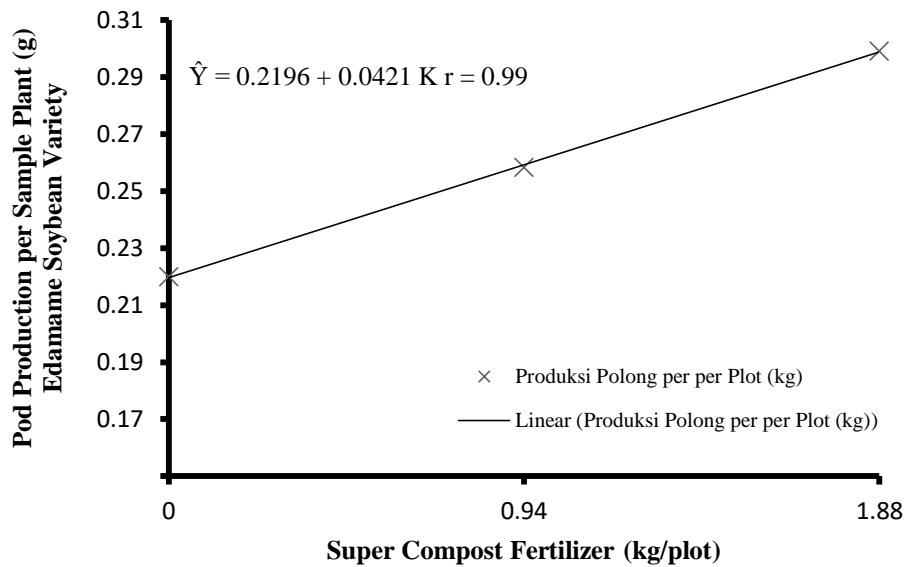


Figure 9. Response Curve of Applying Super Compost Fertilizer to Pod Production per Plot (kg) of Edamame Soybean Variety.

The response of ANN POC concentration to pod production per plot (kg) of soybean variety Edamame resulted in a linear regression analysis with the equation $\hat{Y} = 0.2107 + 0.0022J$ with $r = 0.97$ and can be seen in Figure 10 below.

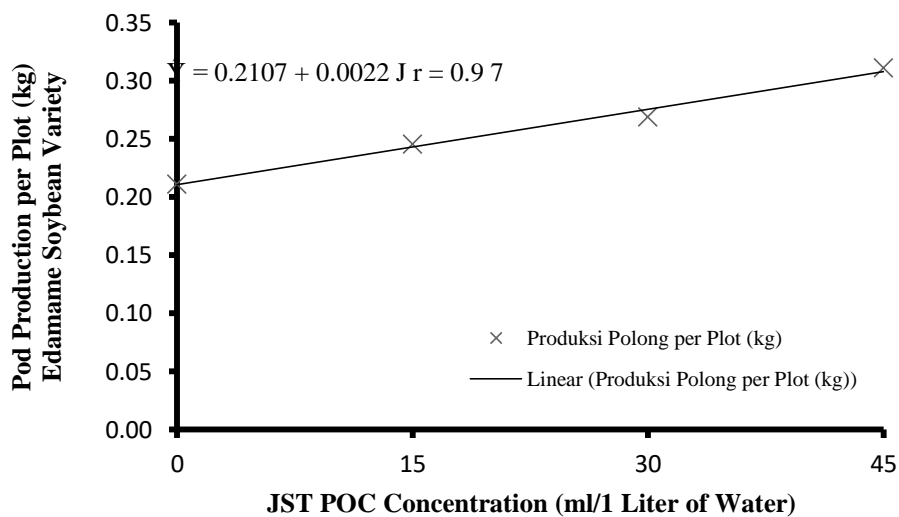


Figure 10. Response Curve of ANN POC Concentration on Pod Production per Sample Plant (g) Edamame Soybean Variety.

Discussion

Response of Super Compost Fertilizer to the Growth and Production of Soybean Plants of the Edamame Variety

Based on the results of the analysis of variance, it was shown that the application of super compost had a significant effect on the observed parameters of plant height, number of branches, number of filled pods per sample plant, sample plant production, and production per plot.

Based on the results of the analysis of variance in the application of compost fertilizer, it showed a significant effect; this was thought to be due to the elemental content available to plants. According to Juarsah (2014), the nutrients absorbed by plants from compost, such as N, P, K, Ca, Mg, and S, are used by plants to form proteins, amino acids, enzymes, energy sources such as ADP, ATP, chlorophyll. The compost increases CEC (cation exchange capacity), and improves soil pH so that nutrients are available in the soil and are used by soybean plants.

Increasing soil organic matter obtained from super compost can improve the soil's physical, chemical and biological properties, add humus, improve soil aeration and drainage, maintain soil structure, provide sufficient oxygen in the soil, and increase water absorption. Soil is better able to hold much water so that groundwater is formed, making it easier for plant roots to absorb nutrients for plant growth and development (Nurhidayati, 2017).

According to Munawar (2011), applied organic matter can improve soil structure through the adhesive properties of organic matter such as bacterial residues, organic gels, hyphae, fungi, and fungal secretions that promote decomposition, thus producing CO₂ gas which soybean plants use to photosynthesis. So plant growth will be more optimal, such as stimulating vegetative growth, namely increasing plant height and branch growth.

Nitrogen nutrients absorbed by plants are used to build new cells, forming carbohydrates, which plants use for growth. The nutrient element nitrogen contained in compost is very important in the vegetative growth of soybean plants because it can stimulate overall growth, especially stems, branches and leaves. The nutrient element phosphorus plays a role in the photosynthesis and respiration of plants such as soybean plants, so it is very important for plant growth. In vegetative growth, soybean plants absorb phosphorus for stem enlargement and the formation of soybean plant branches (Damanik *et al.*, 2010).

According to Wahyono (2010), super compost contains many microorganisms such as populations of Actinomycetes, fungi and bacteria. The application of compost helps microorganisms to produce a sticky substance that helps form soil structure; microorganisms in compost help break down organic matter in the soil to provide nutrients.

Response of ANN POC Concentration on the Growth and Production of Edamame Soybean Varieties

The analysis of variance showed that the POC ANN concentration treatment significantly affected the observed parameters of plant height, number of branches, number of filled pods per sample plant, sample plant production, and production per plot.

Based on the analysis of variance treatment, the concentration of ANN POC showed a significant effect, and this was estimated because POC ANN contains coconut water which contains hormones that help stimulate tissue growth and development such as auxins, cytokinins and gibberellins. According to Solihin in Febriana, *et al* (2018), liquid organic fertilizer contains a mixture of cow manure which contains sufficient nitrogen to provide the nitrogen, phosphorus and potassium needed by soybean plants. Increasing the amount of nitrogen needed by plants, the meristematic tissue at the growing point becomes more active so plants will grow taller.

Provision of ANN POC will spur plant growth, especially leaf growth, the more leaves are formed, the more chlorophyll and will increase the absorption of sunlight so that more photosynthetic and energy is produced for generative growth such as forming pods. According to Suwandi and Nurtika in Muliani, *et al.* (2017), the provision of POC JST can increase the availability of nutrients needed by soybean plants to form chlorophyll such as N, P, K, Ca, and Mg. The nutrient element nitrogen is one of the constituents of porphyrin, porphyrin is a constituent of important metabolic compounds such as chlorophyll and cytochromes, which play a role in photosynthesis and respiration.

Interaction of Super Compost Fertilizer and ANN POC Concentration on the Growth and Production of Soybean Plants of the Edamame Variety

Based on the analysis of variance, it showed that the interaction of super compost fertilizer and ANN POC concentration did not affect all observed parameters.

There was no significant effect on all of the observed parameters. This indicated that the two treatment factors affected each as a single factor without any interaction, meaning that these factors acted independently of one another. There is no significant change between the combination treatments, or it is not significant, it is said that the interaction is not significant. So cooperation between combined factors is said to be independent of each other (Tenaya, 2015).

CONCLUSION

This research was carried out at the Experimental Field of the Faculty of Agriculture, Asahan University (UNA) Kisaran, Asahan Regency, North Sumatra in February - April 2022. This study was arranged based on a factorial randomized block design (RBD) with 2 treatment factors and 3 replications. The first factor was the treatment of super compost (K) with 3 levels, namely K0 = 0 tons/ha (control), K1 = 5 tons/ha (0.94 kg/plot), K2 = 10 tons/ha (1.88 kg/plot). Rhizobium Biological Fertilizer per 250 g of soybean seeds. The second factor is the concentration of JST POC (J) with 4 levels, namely J 0 = 0 ml/liter of water/plot, J 1 = 15 ml/liter of water/plot (1.5%), J 2 = 30 ml/liter of water/plot (3%), J 3 = 45 ml/liter of water/plot (4.5%). The results showed that the treatment of compost had a

significant effect on the concentration of POC ANN (J) which significantly affected the height of plants 3 weeks after transplanting, the number of branches 3 weeks after transplanting, the number of filled pods per sample plant, pod production per sample, and pod production per plot. The best plant height 3 weeks after transplanting at a dose of 1.88 kg of super compost (K 2) is 30.73 cm, the number of branches aged 3 weeks after transplanting is best at a dose of 1.88 kg of super compost (K 2) ie 8.40 branches , the best number of filled pods per sample plant at a dose of 1.88 kg of super compost (K 2) is 50.53 pods, the best pod production per sample is at a dose of 1.88 kg of super compost (K 2) ie 31.43 g, the best production per plot at the dose of super compost (K 2) is 0.30 kg. POC ANN concentration treatment (J) had a significant effect on plant height 3 weeks after transplanting, number of branches aged 3 weeks after transplanting, number of filled pods per sample plant, pod production per sample, and pod production per plot. The best plant height at 3 weeks after transplanting with POC ANN treatment with a concentration of 4.5% (J 3) is 29.23 cm, the best number of branches aged 3 weeks after transplanting is best with POC ANN treatment with a concentration of 4.5% (J 3) namely 7.81 branches , the best number of filled pods per sample plant with POC ANN concentration of 4.5% (J 3), namely 48.76 pods, the best pod production per sample with POC ANN treatment of 4.5% (J 3) namely 29.89 g and the best production per plot with POC ANN treatment with a concentration of 4.5% (J 3) is 0.31 kg. The interaction of super compost fertilizer and POC ANN concentrations had no effect on all parameters of the edamame soybean variety.

REFERENCES

- Adisarwanto, T. 2006. Increasing Peanut Production in Wetland and Dry Land. Self-help Spreader. Jakarta.
- Adie, M. and A, Krisnawati. 2007. Biology of Soybean Plants. Research Institute for Nuts and Tubers (BALITKABI). Poor.
- Alfurkon, S. 2014. Jember Soybeans Penetrate the International Market. Scientific journals.
- Nurlisan, A. Rasyad and S. Yoseva. 2013. The Effect of Organic Fertilizers on the Growth and Yield of Soybean (Glycine max (L.) Meril). Riau: University of Riau. Scientific journals.
- Nurhidayati. 2017. Soil Fertility and Health. Intimedia. Poor.
- Juarsah. 2014. Utilization of Organic Fertilizers for Organic Agriculture and a Sustainable Environment. Presiding of the National Seminar on Organic Fertilizers. Soil Research Institute. Bogor.
- Munawar, A. 2011. Soil Fertility and Plant Nutrition. IPB Press. Bogor.
- Wahyono, S. 2010. Review of the Benefits of Compost and Its Application in Various Agricultural Fields. Center for Environmental Technology Agency for the Assessment and Application of Technology. Journal Vol. 6. No. 1. Pgs 29-38.

- Damanik, Madjid., Hasibuan, BE, Fauzi., Sarifuddin., Hanum, H. 2010. Soil Fertility and Fertilization. USU-Press, Medan.
- Febrina, M., Prijono, S. Kusumarini, N. 2018. Utilization of Liquid Organic Fertilizer to Increase Nitrogen Uptake and Growth and Production of Mustard (Brassica juncea L.) on Sandy Soils. Journal of Land and Land Resources. Vol. 5. No. 2.