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The Effect of Giving Vermicompos Fertilizer and NPK 16:16:16 on Growth and Production of Edamame Soyabean (*Glycine Max* (L) Merrill)

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ABSTRACT

This research has been done in the experimental farm of the Faculty of Agriculture, Islamic University of Riau, Jalan Kaharuddin Nasution, Bukit Raya, Pekanbaru. This study take three months since July to September 2019. The objective of this study was to find out the interaction effect and main effect of giving vermi compost fertilizer and NPK 16:16:16 to the growth and production of edamame soybean. The experimental design used was Completely Randomized Design factorial. The first factor was giving vermi compost (V) fertilizer with doses 0, 500, 1000, 1500 g per plot, and second factor was gift NPK 16:16:16 (N) Fertilizer with a dose of 0, 15, 30, 45 g per plot so that there are 16 combinations repeated 3 times to obtain 48 experimental units. Parameters that were observed, were plant height, relative growth rate, number of pods per plant, percentage of fruitful pods, and seed weight per plant. The data analysis of observation in variance then done with test carry on HSD level of 5%. The results showed that the interaction of vermi compost fertilizer and NPK 16:16:16 applications significantly affected the height of the plant, amount of pod per plant, percentage of pod pithy, and Seed Weight per plant. The best treatment was vermi compost fertilizer at a dose of 1500 g/plot and NPK 16:16:16 with a dose of 30 g/plot (V3N2). The main effect of the application of vermi compost fertilizer was significant to whole parameter. The best treatment was vermi compost witha dose of 1500 g/plot (V3). The main effect of application of NPK 16:16:16 was significant to whole parameter. The the best treatment was NPK 16:16:16 with a dose of 30 g/plot (N2).

INTRODUCTION

Soya bean (*Glycine max* (L.) Merrill) is one of the main commodities in Indonesia. The domestic demand for soybeans will increase every year with the increase amount of people. One of the soya bean type which interested by people is Edamame soybeans is of interest to be planted in Indonesia. This nuts harvested andconsumed when still not ripe fully (Coolong, 2009).

Edamame is the term used for a type of green soybean that can be consumed. Edamame and yellow soya bean has a similar species ie *Glycine max* (L.) Merrill, but

edamame has a sweeter flavor than yellow soybeans, a soft texture, the aroma of nuts, and seeds that are larger than yellow soybeans (Setiawati et al., 2017).

Edamame vegetable soybeans contain a fairly high nutritional value, each 100g seeds contain 582 kcal, 11.4 g protein, 7.4 g carbohydrates, 6.6 g fat, vitamin A or carotene 100 mg, B1 0.27 mg, B2 0.14 mg, B3 1 mg, and vitamin C 27, as well as minerals such as phosphorus 140 mg, calcium 70 mg, iron 1.7 mg and potassium 140 mg (Pambudi, 2013). Edamame is easier to digest than soybeans Because edamame's trypsin-inhibitor levels are lower. Content Edamame nutrition is equivalent to cow's milk or higher than beef, edamame contains little unsaturated fat but is rich in proteins, carbohydrates, and antioxidants that can help launch the system digestion and can help maintain weight.

The production of edamame soya bean in Indonesia specificly not yet recorded statisticly by Statistics Center Institution (BPS). However, the production of edamame soya bean at the farm level has shown good production where yields production farmers in Java East Province already enter the market export. Based on export traffic data at the Agricultural Quarantine Agency, the total recorded export edamame national year 2019 reached 6,790.7 tons.

Edamame soybeans have a large market opportunity to cultivate because the market prospects are still open widely. The price of edamame soybeans is sufficiently high if compared to price of yellow soya bean, where the price of edamame soya bean ranges from Rp. 30,000 to Rp. 50,000 per kg for fresh edamamae. Edamame that used as seeds has range of prices between Rp. 85,000 to Rp. 120,000 per kg.

Edamame soybean cultivation in Indonesia is still relatively small, meanwhile, the market need is very large. Edamame soybean production only reached 7.5 tons/ha while Edamame soybean productivity can reach 10-12 tons/ha (Anonymous, 2014). Development of Edamame soya bean needs to be done to increase productivity and have good prospects for development.

Vermi compost is the fertilizer that results from composting waste organic with the help of worms which is capable of fertilizing land and can improve the physical, chemical, and biological properties of soil (Ayunita et al, 2014). Vermi compost contains macronutrients (N, P, K, Ca, Mg, S) and micro (Fe, Mn, B, Mo, Cu, Zn, Cl). In addition, vermi compost also contains 13.88% humus and growth hormones such as auxin, gibberellins, and cytokinins as well as Soil microbes that are beneficial to plants, such as bacteria and fungi. All The content contained in vermi compost is strongly effectd by the type of media subject, the type of earthworms used, and the age of the vermi compost Alone.

In addition to providing organic vermi compost fertilizer, it was also given inorganic fertilizers to meet the needs of nutrients for plants, where gift vermi compost can repair structure land so that on giving inorganic fertilizers all the nutrients contained therein can be absorbed with Good by the plant. The fertilizer inorganic which used is NPK 16:16:16 fertilizer where NPK 16:16:16 fertilizer is of compound containing 16% Nitrogen, 16% Phosphorus, 16% Potassium, and several other nutrients That very needed by plants. The objective of this study was to find out the interaction effect and main effect of giving vermi compost fertilizer and NPK 16:16:16 to the growth and production of edamame soybean.

METHODS

Location and Time

This research was conducted at the experimental farm of the Faculty of Agriculture, Riau Islamic University, Pekanbaru, Riau Province, which are located at coordinates between 0.446822″N and 101.457299″E. This research was done for three months, from July to September 2019.

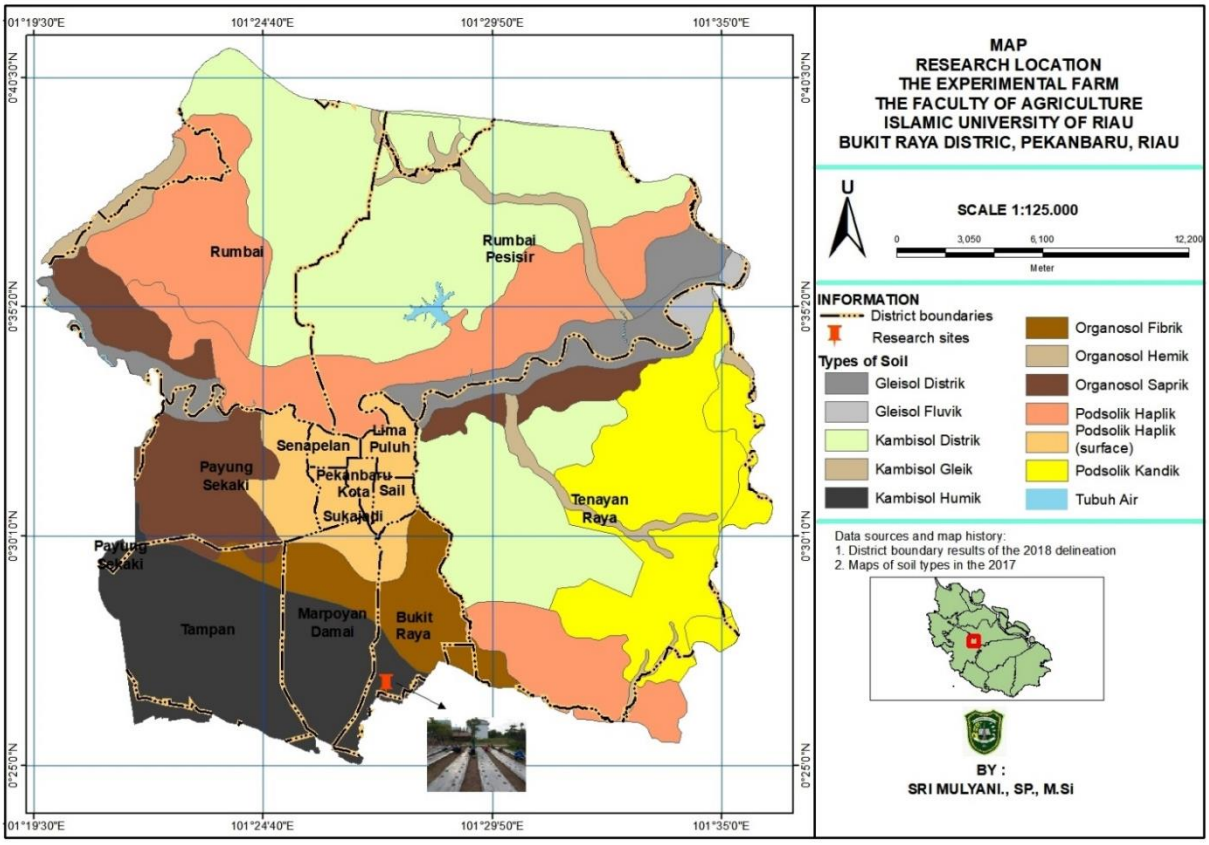

Figure 1. Research location map

Method of Colloecting Data

The subject used in this research was edameme soybean seeds Ryoko variety, Vermi Compost Fertilizer, NPK Mutiara 16:16:16, Furadan, and Alika Insecticide. While the tools used are hoes, machetes, sickles, gembor, buckets, hand sprayers, zinc signposts, plastic rope, nails, scales, hammers, cameras, and stationery.

The design used in the research was a completely randomized design consisting of 2 factors, namely the administration of vermi compost (V) consisting of 4 treatment levels, namely with a dose of V0: without vermi compost, V1: 500 g/plot, V2: 1000 g/ plots, V3: 1500 g/plot. The second factor is the dose of NPK 16:16:16 (N) fertilizer consisting of 4 levels, namely with a dose of N0: without NPK 16:16:16, N1: 15 g/plot, N2: 30 g/plot, and N3: 45 g /plot. Thus, 16 treatment combinations were obtained with 3 repetitions for a total of 48 experimental units. Each experimental unit consisted of 9 plants and 3 plants were used samples for a total of 432 plants.

Before planting, inoculation is done first by using soil used from legume plants in a ratio of 1 kg of seeds to 250 grams of soil. The inoculated seeds are then planted to a depth of 3 cm with a spacing of 30 x 30 cm. Seeds are planted in 1 seed per planting hole.

The giving of vermi compost treatment was done a week before planting. Given the method shown on the plot then stirred with land in a manner equally by dose treatment that is withoutgift (V0), 500 g/plot (V1), 1000 g/plot (V2), 1500 g/plot (V3).

NPK 16:16:16 given 1 time gift on moment plant, givenby running and then covered with soil. Application of fertilizer NPK 16:16:16 is done according to the dose of each treatment that is without gift (N0), 15 g/plot (N1), 30g/plot (N2), 45 g/plot (N3).

The maintenance activities include giving the water, weeding, hilling, and controlling pests and diseases. Harvesting is done after the Edamame plants fulfill the criteria harvest that is, pod fresh, the pods are evenly colored green, the pods are full and not too old or the color is not yellow. Harvesting is done by picking the pods from its stalk.

Parameters that observed, were height of plant, relative growth rate, number of pods per plant, percentage of pithy pods, weightseeds per plant, and harvest index.

Data Analysis

Statistical analysis of observed data was done using Analysis of Variance (ANOVA) with F-test at 5% level of significance using R- Program. If the calculated F is greater than the F table, then a further test of the Honest Significant Difference (HSD) is done at the 5% level.

RESULTS AND DISCUSSIONS

Plant Height (cm)

The results of observing the height of edamame soybean plants with fertilizer application vermi compost and NPK 16:16:16 showed the interaction effect and the main effect of vermi compost and NPK fertilizer 16:16:16 effect on plant height parameters. The results of the Honestly Significant Difference (HSD) test at the 5% level can be seen in Table 1.

Table 1. Average tall of Edamame soya bean with gift fertilizer vermi compost and NPK 16:16:16 (cm)

Vermi compost (g/plot)	NPK 116:16:16 (g/plot)			
	N0 (0)	N1(15)	N2 (30)	N3 (45)
V0 (0)	28,66 f	30,00 ef	36,33 ab	34,00 b-d
V1 (500)	36,00 a-c	33,00 c-e	31,66 d-f	36,33 ab
V2 (1000)	32,00 de	36,33 ab	31,66 d-f	32,33 de
V3 (1500)	33,33 b-d	33,66 b-d	38,00 a	33,33 b-d

The number in rows and columns followed by the same small letter show no significant difference (HSD test, at P = 0.05)

The data in Table 2 showed that the combination of vermi compost 1500 fertilizer treatment g/plot and NPK 16:16:16 30 g/plot (V3N2) with the highest plant height, namely 38.00 cm and was not significantly different from treatments V1N3, V2N1, V1N0 and V0N2

however was significantly different from other treatments. Lowest plant height produced by a combination of treatments without the application of compost and vermi fertilizer without NPK gift 16:16:16 (V0N0) with a height plant 28.66 cm.

Edamame soybean plants with vermi compost and NPK 16:16:16 have height of plants which better compared to the description of the edamame soybean plant is 26.7 cm high (Asadi, 2009). The magnitude of the increase in edamame soybean plant height compared to the description was 42.32%. This is due to the need for nutrients in edamame soybean plants with vermi compost and NPK 16:16:16 sufficient to produce Good plant growth. Rehman et al., (2023) the application of vermicompost enhances soil health and crop productivity due to improved nutrient uptake, the presence of humic substances, phytohormones, and enhanced micro-bial activities in Vermi compost.

The combination of vermi compost 1500 fertilizer treatment g/plot and NPK 16:16:16 30 g/plot (370 kg/ha) there was an increase in plant height of edamame soybeans packages by 32.59% compared to control. The results of this research provide a greater increase in plant height compared to research by Saputra and Anggraini, (2022) Application of NPK 16:16:16 300 kg/ha and Gandasil B 6 g/l water resulted in an increase in edamame soybean plant height of 13.2% compared to control. Kelaka (2010) suggests that compost has a function as subject repairer land Because can repair quality physique, chemistry, and biology land. Compost can repair the content subject of organic land to increase fertility and stimulate rooting plants. Increased organic matter content will also increase the ability of Soil to store groundwater and the activity of soil microorganisms. Furthermore, Sutedjo and Kartaspoetra (2015), state that to be able to grow well, plants need nutrients N, P, and K which are nutrients essential, Where the element hara This very role in the growth of plants generally in the vegetative phase. So plant growth becomes better with a combination of organic fertilizer (vermi compost) and inorganic fertilizer (NPK 16:16:16) at the right dose when compared to other treatment combinations.

Relative Growth Rate (g/day)

Results of observations of the relative growth rate of edamame soybean plants in age 14-21 day after planting (DAP), and 21-28 DAP after analysis of variance showed that the interaction of vermi compost and NPK fertilizer 16:16:16 does not affect the relative growth rate parameters at edamame soybean plants, the main effect of applying vermi compost and fertilizer NPK 16:16:16 affects the relative growth rate parameter. The results of the Honestly Significant Difference (HSD) test at the 5% level can be seen in Table 2.

The data in Table 2 showed that the relative growth rate is 14-21 DAP and 21-28 DAP in the treatment vermi compost with a dose of 1500 g/plot (V3) was significantly different from other treatments. NPK 16:16:16 treatment with a dose of 30 g/plot (N2) was not significantly different from the N1 and N3 treatments, but significantly different with treatment N0.

This is due to the provision of vermi compost at a dose of 1500 g/plot which contains many macronutrients that can improve the structure of soil and keep nutrients in the soil

available. The control treatment was different in comparison with the treatment of others due to the absence of additional nutrients available that can be absorbed by the root plant. Assefa and Tadesse (2019) the use of organic fertilizers has advantage of being cheap, improving soil structure, texture and aeration increasing the soils water retention abilities, stimulating healthy root development. and contributes greatly to improving soil fertility.

Table 2. Relatively growth rate of Edamame soya bean with gift vermi compost and NPK 16:16:16

DAP	Vermi compost (g/plot)	NPK 116:16:16 (g/plot)				Average
		N0 (0)	N1(15)	N2 (30)	N3 (45)	
14 – 21	V0 (0)	0,13	0,15	0,17	0,17	0,15 c
	V1 (500)	0,16	0,18	0,19	0,21	0,19 b
	V2 (1000)	0,19	0,22	0,22	0,23	0,21 b
	V3 (1500)	0,21	0,24	0,27	0,21	0,24 a
	Average	0,17 c	0,20 ab	0,21 a	0,20 ab	
21 – 28	V0 (0)	0,16	0,16	0,18	0,18	0,17 c
	V1 (500)	0,18	0,18	0,19	0,20	0,19 bc
	V2 (1000)	0,20	0,20	0,21	0,22	0,21 b
	V3 (1500)	0,21	0,25	0,29	0,25	0,25 a
Average		0,19 b	0,20 ab	0,22a	0,21 ab	

The number in rows and columns followed by the same small letter show no significant difference (HSD test, at P = 0.05)

The highest relatively growth rate describes the ability of plants to accumulate biomass produced by plants every day. Kindly biological fertilizer vermi compost can increase the activity of microorganisms in the soil to support growth. Likewise with the provision of NPK 16:16:16 at a dose of 30 g/plot, where the NPK 16:16:16 contains elements N, P, and K which can support the growth and development of edamame soybean plants.

The growth plants are marked with good development leaves on the plant, if the leaf develops at optimal, so will Lots produce energy To support the growth plant. Growth plants are effectd by the relative growth rate of plants per mg/cm ^{2} /day, so that rate of growth is relatively related to the growth of vegetative plants.

The plant growth rate is affected by the net assimilation rate and index leaf area. With lots its sunshine received by the plant, so plant gives a response with a reproduced amount of sheet leaf. An increasing amount of sheet leaf, the more Lots carbohydrates can produced in the process of photosynthesis so that plants accelerate their growthand development of plants that leading to optimal results from plants which would be produced (Gardner, 1991) in nature (Afriandi, 2018).

Pod Amount per Plant (fruit)

Results observation amount pod per plant on of Edamame soya bean by adding vermi compost and NPK 16:16:16 after analyzed variety show that effect interaction and main gift fertilizer vermi compost and NPK 16:16:16 influential to parameter number of pods per plant. The results of the Honestly Significant Difference (HSD) test at the 5% level can be seen in Table 3.

Table 3. Average amount pod per of Edamame soya bean with gift fertilizer vermi compost and NPK 16:16:16 (cm)

Vermi compost (g/plot)	NPK 116:16:16 (g/plot)				Average
	N0 (0)	N1(15)	N2 (30)	N3 (45)	
V0 (0)	16,00 k	16,66 jk	22,66 fg	21,00 gh	19,08 c
V1 (500)	29,33 cd	27,00 de	21,00 gh	31,33 bc	27,16 a
V2 (1000)	18,00 ijk	32,66 ab	25,33 ef	19,00 hij	23,75 b
V3 (1500)	24,00 f	28,00 de	35,00 a	20,33 ghi	26,83 a
Average	21,83 c	26,08 a	26,00 a	22,91 b	

The number in rows and columns followed by the same small letter show no significant difference (HSD test, at P = 0.05)

The data in Table 3 showed that the combination vermi fertilizer treatment compost 1500 g/plot and NPK 16:16:16 30 g/plot (V3N2) with the highest number of pods planted namely 35.00 fruit and not significantly different from the V2N1 treatment but different significant with other treatments. The lowest number of pods planted was produced by combination treatment without gift fertilizer vermi compost and gift NPK 16:16:16 (V0N0) by number of pods planting 16 pieces.

The results of this study resulted in a lower number of pods when compared to the results of a study by Debela et al., (2021) which was conducted in the country of Ethiopia, the results of the research are that the maximum number of pods per plant (87.6) was produced at the combination of highest rates of the two fertilizers (100 kg NPS ha-1, 2 tons vermicompost ha-1) with inoculation whereas the minimum number of pods per plant (51.53) was recorded from plants supplied with combined 50kg NPS ha-1 with 0 ton vermicompost ha-1 without inoculation. This indicates that the synergistic effect of the mineral fertilizers and mineralization of organic manures and bio-fertilizer throughout growing period did not put the plants nutrient stress at any stage resulting in enhancing number of pods per plants.

This is related to the existence of gift fertilizer vermi compost and NPK 16:16:16 where both fertilizers contain the element phosphorus function in spurring root growth, the formation of ATP, accelerating speed photosynthesis which produce photosynthate and then will translocate to organ recipient-like pods. According to Zahrah (2011), in fertilization plants will be better when using a type of fertilizer, dose, method, and time gift which appropriate. Deficiency or excess of nutrients including NPK will have no effect Good for plants.

Mardono (2010), states that the addition of fertilizer organik into the soil will cause one or more cations be released from their bonds and absorptive into free ions that can be absorbed by plant roots. Sutedjo (2010), put forward that the use of fertilizer organic will can increase nutrient content and improve soil structure because it can stimulate the development of microorganisms in the soil. So if given in quantity Sufficient amounts will ultimately increase plant photosynthesis will increase the process physiological which happen in plant, so that growth becomes optimal and will produce production maximum.

Vermi compost fertilizer has many advantages compared to fertilizer other organic because vermi compost is rich in micronutrients and essential as well as contain hormone that grows plant like auxin, gibberellin, and cytokinin which absolute needed For growth plantthe maximum. Results study Indrayati and Omar (2009) showed that the addition of ingredients organic on treatment fertilization NPK happens enhancement Good vegetative growth and generative growth are seen in the number of fertile books, the number of pods/plants, amount of seeds/plants, Seed Weights/plants and weight 100 and soybean yield.

Percentage of Pithy Pod (%)

Results of observations of the percentage of pithy pods on edamame soybean plants by administering vermi compost and NPK 16:16:16 after analysis The variance showed that there is an interaction and main effect of fertilizer application vermi compost and NPK 16:16:16 effect the percentage parameters pithy pods. The results of the Honestly Significant Difference (HSD) test at the 5% level can be seen in Table 4.

The data in Table 4 showed that the combination of treatment with vermi compost 1500 g/plot and NPK 16:16:16 30 g/plot (V3N2) is treatment best with percentage pod pithy The highest was 96.07% and was not significantly different from treatments V1N1, V2N1, V3N1, V1N2, V2N2, V2N3, and V3N3 but significantly different from treatment other. The lowest percentage of pithy pods was produced by the combination of treatments without giving vermi compost fertilizer and giving NPK 16:16:16 at a doseof 15 g/plot (V0N1) with a percentage pod pithy 63.13%.

Table 4. The average percentage of pithy pods in soybean plants Edamame with gift fertilizer vermi compost and NPK 16:16:16 (cm).

Vermi kompos (g/plot)	NPK 116:16:16 (g/plot)				Average
	N0 (0)	N1(15)	N2 (30)	N3 (45)	
V0 (0)	66,66 fg	63,13 g	73,51 efg	78,31 c-e	70,40 d
V1 (500)	82,94 b-e	83,88 a-e	87,14 a-d	81,10 b-e	83,77 bc
V2 (1000)	77,73 def	88,79 a-d	86,87 a-d	87,72 a-d	85,28 ab
V3 (1500)	80,55 b-e	90,47 abc	96,07 a	91,74 ab	89,71 a
Average	76,97 d	81,57 abc	85,90 a	84,72 ab	

The number in rows and columns followed by the same small letter show no significant difference (HSD test, at P = 0.05)

Providing vermi compost fertilizer at a dose of 1500 g/plot becomes the fertilizer best, as well as administering NPK 16:16:16 at a dose of 30 g/plot is the best treatment, this is because giving NPK 16:16:16 is capable of providing need element hara for plant, Where provide element N, P, and K for plants as well. Idwar et al, (2014) stated that the phase formation of pods requires the nutrient N because the need for hormones and Enzymes is quite large. To stimulate the formation of flowers, fruits, and seeds as well as To make the seeds bigger, the plant needs the element P. Meanwhile, For increased translocation of sugar on the formation of starch and proteins (food reserves), plants need element K. The amount amount pod That formed thus affects the yield of soybeans. The formation of soybean plant podsis very effectd by element nutrients, water, and light eye day available.

Crop yields, vegetative growth and reproduction depend on access to adequate supplies of mineral nutrients, and among these nutrients, N, P, and K are essential for high plant productivity (Zaman et al., 2015). Increasing the amount of N applied during the early growth period promotes vegetative growth, which leads to high yields (Yani et al., 2001). As plants grow, the abundance of rhizobia increases, and their ability to fix atmospheric N improves; however, excessive applications of N fertilizer inhibit rhizobial activity and impede fower bud diferentiation and yield formation (Zafar and Athar, 2013). Moreover, P afects root morphology and growth and therefore water and nutrient uptake, resulting in efective drought mitigation and improved yields1 (Hansel et al., 2017). K plays important roles in plant growth and in nearly all related functions (Karimi., Et al., 2012; it contributes greatly to cell osmotic concentrations and the maintenance of stomata guard cell turgor, increases the photosynthesis rate and biomass production, and increases yields (Yin et al., 2019).

Seed Weight Per Plant (g)

The results of dry planting seed weight observation on Edamame soya bean by adding vermi compost and NPK 16:16:16 after analyzed variety, show that effect interaction and main gift fertilizer vermi compost and NPK 16:16:16 influential to the parameter of dry seed weight of planting. The results of the Honestly Significant Difference (HSD) test at the 5% level can be seen in Table 5.

Table 5. Average Seed Weight per plant in soybean plants Edamame with fertilizer vermi compost and NPK 16:16:16 (cm)

Vermi compost (g/plot)	NPK 116:16:16 (g/plot)				Average
	N0 (0)	N1(15)	N2 (30)	N3 (45)	
V0 (0)	36,10 g	36,33 g	39,86 b-g	39,06 c-g	37,84 c
V1 (500)	42,66 a-d	42,00 a-e	38,86 d-g	43,03 a-c	41,64 a
V2 (1000)	37,50 fg	43,16 ab	41,33 b-f	38,00 fg	40,00 b
V3 (1500)	41,06 b-f	42,36 a-e	45,50 a	38,43 e-g	41,84 a
Average	39,33 c	40,97 ab	41,50 a	39,63 bc	

The number in rows and columns followed by the same small letter show no significant difference (HSD test, at P = 0.05)

The data in Table 5 showed that the combination of vermi compost 1500 fertilizer treatment g/plot and NPK 16:16:16 30 g/plot (V3N2) with Seed Weight dry the highest plant was 45.50 g and not significantly different from the V2N1, V3N1, V1N0, V1N1 and V1N3 but significantly different from other treatments. Seed Weight dry planting Lowest generated by combination treatment without fertilizer application vermi compost and NPK 16:16:16 (V0N0) with dry seed weight cropping 36.10 g.

The quality of the seeds produced is good as a result of the application of fertilizer vermi compost which contains the macronutrients N, P, and K, and also contains growth hormones (PGR) such as auxin, gibberellin, cytokinin, and contains Soil microbes are beneficial to plants. Shinha et al., (2019) vermicompost is rich in NKP (nitrogen 2-3%, potassium 1.85-2.25% and phosphorus 1.55-2.25%), micronutrients, beneficial soil microbes and also contain plant growth hormones & enzymes. It is scientifically proving as miracle

growth promoter & also plant protector from pests and diseases. In addition, the application of NPK 16:16:16 fertilizer plays a role in increasing the availability of N, P, and K nutrients in the soil, so that during the formation of seeds in the pods the plant takes place optimally. Vacheron et al., (2013) the plants will receive the proper amounts of nitrogen, phosphorus, and potassium by using NPK fertilizer.

This is to Sutedjo's statement (2010), that the use of fertilizer Organics will be able to change the nutrient content and improve it structure of land Because the existing development body is small in land. So if given in the right amount, it will increase plant photosynthesis which Finally will increase fresh fruit weight per plant. Giving fertilizer organic especially formerly given so that can repair structure land so that on gift fertilizer NPK 16:16:16 all the nutrients contained in it can be absorbed well by plants. Soya beans need elements N, P, and K in amount which is Enough. This is according to Novriani's (2010) statement that the P element is very important in the formation of seeds and Lots found in the seed, if plants are given the element Hara P enough then the formation of seed will be optimal so weight the seeds Also will experience enhancement. Besides That, nutrient K which very important For achieving results plant which optimum. Hanum (2010) states that the enhancement of nitrogen plants will affect the rate of P uptake, and consequently, the seed filling rate, Where find outn plants need the elements hara N and P which is tall For formation seed.

CONCLUSIONS

Based on the study, this can concluded that:

1. The interaction of vermi compost fertilizer and NPK 16:16:16 applications significantly affected the height of the plant, amount of pod per plant, percentage of pod pithy, and Seed Weight per plant. The best treatment was vermi compost fertilizer at a dose of 1500 g/plot and NPK 16:16:16 with a dose of 30 g/plot (V3N2).
2. The main effect of the application of vermi compost fertilizer was significant to whole parameter. The best treatment was vermi compost witha dose of 1500 g/plot (V3).
3. The main effect of application of NPK 16:16:16 was significant to whole parameter. The best treatment was NPK 16:16:16 with a dose of 30 g/plot (N2).

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