

# The Effect Of Bokashi Pig Manure to The Growth of Eggplant (*Solanum melongena*)

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## **Abstract.**

*This study aims to determine the effect of pig poop bokashi on the growth of eggplant (*Solanum melongena*). The experimental research method (True Experiment) with a Completely Randomized Design (CRD) consisting of six treatments and five replications. The population of this study was 30 eggplant (*Solanum melongena*). The research sample was selected using a simple random sampling strategy. The research data were analyzed using the Kolmogorov-Smirnov test for normality, Bartlett test for homogeneity, and ANOVA for testing the hypothesis. The research findings obtained indicate that the influence of pig poop bokashi on the growth of eggplant (*Solanum melongena*) both in plant height, stem diameter, and number of leaf strands. So it can be concluded that pig poop bokashi can be used as an alternative to replace the presence of inorganic fertilizer (chemical fertilizer). Suggestions offered by researchers, should the use of bokashi pig poop manure can be further improved among farmers and the community in general because in addition to addressing the use of inorganic fertilizer that can affect the quality of soil and plants also affect finances that must be spent to buy inorganic fertilizer.*

**Keywords :** Pig Poop Bokashi; plant growth; Pig Poop

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## 1. INTRODUCTION

Eggplant (*Solanum melongena*) is one type of horticultural crops is quite important in Indonesia because it is one of the types of fruit and vegetables. Eggplant belongs to the group of fruit because it has seeds and is also included in the group of vegetable because there are some characteristics of the vegetable that its like, contain vitamins, they contain fiber, easy to wither and rot, as a food ingredient, as well as including plants of horticultural or can be cultivated. In addition, the eggplant (*Solanum melongena*) contains quite a lot of fiber than the type of other vegetable. The amount of supply of the plants of eggplant (*Solanum melongena*) until now still not meet the needs of a growing community, this happens because the cultivation of eggplant is still done traditionally. In addition, people do not know benefits of eggplant well.

The Program of the Government is agricultural extension and the provision of assistance in the form of seeds. However Government efforts have not yielded results due to the level of public demand that is very high on eggplant (*Solanum melongena*). It triggers the increase in the price of eggplant (*Solanum melongena*) in the market. The low crop production eggplant (*Solanum melongena*) also can not be separated from the factors that affect the growth of a plant either outside factors or internal factors. On the other hand is caused by lack of knowledge of the community, particularly farmers in the conduct of maintenance and care of plants eggplant red curly especially in applying fertilizer to support plant growth.

The use of fertilizer is very likely in the world of agriculture these days, especially the use of fertilizer with a basic material of inorganic. This encourages the high level of dependence of farmers on inorganic fertilizers, even often using with an excessive amount of. The use of inorganic fertilizers, have a positive impact on increase in crop production. However, on the other hand inorganic fertilizers can have a negative impact, such as the occurrence of environmental pollution and the inefficiency of fertilization in most of the area of intensification of food crops (Bakrie, 2010:26). In addition to no longer improve the results, the use of inorganic fertilizers with a dose that is not appropriate can reduce the production of eggplant (*Solanum melongena*) and can interfere with the quality of the soil and plants.

To reduce the use of inorganic fertilizers, it is necessary to use organic fertilizer. Organic fertilizer is a fertilizer that is partially or entirely composed of organic material derived from plants or

animals that have been through the engineering process, can be solid or liquid that is used to supply organic matter, improve the physical, chemical and biological soil (Sudirja, 2007: 334).

One type of organic fertilizer is bokashi. According to Indriani (2001:41) "bokashi is the compost that is produced through fermentation with the provision of Effective Microorganism-4 (EM-4) which is one of the activators to speed up the process of making compost". Effective Microorganism-4 (EM-4) an activator that in it there is a bacterial decomposition of the organic materials used for the process of making bokashi which can maintain the fertility of the soil so that it is likely to improve and maintain the stability of crop production (Ruhukail, 2011:19), as evidenced by the results of previous research which showed that bokashi has better quality in fertilize the plants, such as bokashi, which is derived from pig manure.

Pig manure is easy to obtain, the amount is a lot, but not utilized, causing various kinds of problems, such as air pollution, causing diseases such as allergies, and even trigger social conflict. It is caused due to lack of knowledge of the community to use and modify the pig manure into organic fertilizer.

Based on interviews of researchers to some of the farmers in the local area show that the use of bokashi pig manure as fertilizer to help the growth of food crops such as eggplant plants (*Solanum melongea*), even the farmers did not know the terms and benefits of bokashi. Farmers tend to use fertilizer NPK fertilizer and fruit that are part of inorganic fertilizers. This research aims to know the effect of bokashi pig manure pig on plant growth of eggplant (*Solanum melongea*).

## II. METHODS

This study was conducted from February to March 2020. The material used is a plant of eggplant (*Solanum melongea*), black soil, pig manure, bran, rice husk, sugar sand which is melted, a solution of EM-4, and water to taste. The tool used in this research is a bucket, a shovel, cement, wood gatherers, cover the nose, burlap sacks, wooden stirrer, tarp, scales, glass beaker, thermometer, poly bag, wood stand, plastic glass, nails, hammer, roll meter, calculator, camera, pH meter, rope, and stationery.

Bokashi pig manure are given on the eggplant plants (*Solanum melongea*) is 15 kg with each dose of P1 (200 gr), P2 (400 gr), P3 (600 gr), P4 (800 gr), and P5 (1000 gr). The implementation of the research includes the collection of pig manure in the cage before the cage is cleaned, the drying of pig manure, making bokashi pig manure, weighing the dose each bokashi pig manure, making room control planting of eggplant (*Solanum melongea*), soaking plant seeds of eggplant (*Solanum melongea*), measuring temperature and soil pH, plant breeding eggplant (*Solanum melongea*), the transfer plant seeds of eggplant (*Solanum melongea*) in each polybag, provision of bokashi pig manure according to treatment, and the measurement of growth include plant height, stem diameter, and the amount of leaf blade.

This study was designed using completely Randomized Design (CRD) with six treatments and five replications so that there are 30 units of units of the experiment. Analysis of test data using kolmogrov-smirnov for normality test, bartlett's for homogeneity, and ANOVA to test the hypothesis. When there is a real difference between treatment continued with Different test Real Honest/Tukey (HSD) test Bedanya terkecil/LSD (BNT), and Duncan test.

## III. RESULTS AND DISCUSSION

### 1. Plant Height

Based on the analysis of the data shows the provision of bokashi pig manure gives a good influence on plant height in all treatments except for treatment P0 (without giving bokashi pig manure). This is because without the provision of bokashi pig manure can not meet the nutrient needs of the plants of eggplant (*Solanum melongea*), so that the eggplant plants that only rely on the nutrients supplied from the soil. Meanwhile, the plant of eggplant (*Solanum melongea*) given bokashi pig manure has a high a good crop because of the availability of nutrient elements to plant eggplant can be fulfilled for the phase of plant height of eggplant (*Solanum melongea*). In line with

the opinion of the Kustalani (2017: 126) that the fulfillment of macro elements caused by the influence of the fertilization treatment to the increase of the vertical height of the plant.

Provision of bokashi pig manure for all doses on the measurement of 5 weeks after planting give real effect to the high vertical plant eggplant the. This is because bokashi pig manure is already fully decomposed so that nutrients contained therein can already be well absorbed by the eggplant plants such. In line with the opinion Saragih (2008: 19) that the bokashi which is decomposed will be good for agriculture so it contains organic matter, nitrogen, and microorganisms is high and so is preferred by the plant than fresh ingredients. On the other hand, administration of a dose of bokashi 1000 gr (P5) is to give the best results than the dose of the other on plant height of eggplant such.

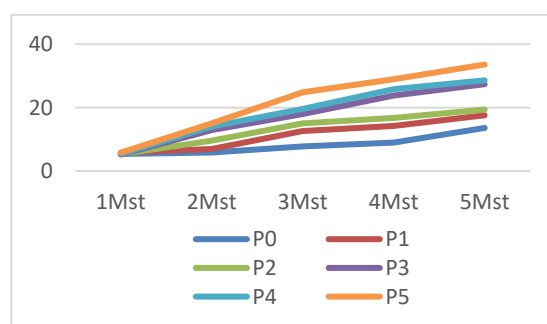
Bokashi pig manure given at a dosage of 1000 gr (P5) gives the best results on plant height of eggplant (*Solanum melongena*) compared with dosing other. This happens because more and more doses of bokashi pig manure are given on the eggplant plants (*Solanum melongea*) the more nitrogen available to plant eggplant the better the growth of the plant height of eggplant such. Nitrogen is a constituent of many compounds amino acids needed in the growth of the vegetative parts such as stems. Thus affecting the height of the plants of eggplant (*Solanum melongena*).

**Tabel 1.** Observational Data of High-Stem Plants of Eggplant (*Solanum melongena*)

Plk	Height rod				
	1Mst	2Mst	3Mst	4Mst	5Mst
P0	5.4a	5.9a	7.8a	9a	13.6a
P1	5.8a	7a	12.6a	14.2a	17.6a
P2	5.3b	9.6b	15b	16.8b	19.4b
P3	5.2b	12.9b	18b	23.8b	27.4b
P4	5.4a	14a	19.6a	25.8a	28.6a
P5	5.8a	15a	24.8a	29a	33.6a

Description : Values in each column followed by the same letter indicate not significantly different by the test of LSD at  $\alpha$  0.05

Table 1. Shows that more and more doses of bokashi given on the eggplant plants (*Solanum melongena*) the more significant effect on the growth of eggplant plants such. P0 was not significantly different with P4 and P5, P5 are not significantly different with the P1 but different real with P2 and P3. From the analysis of the data showed that a dose of bokashi best that can be given to plant eggplant red curly are 1000 gr (P5). In line with the opinion Sahetapy (2017: 80) that from five treatment doses of bokashi fertilizer pig manure is given, then there is better growth that is found on a dose of bokashi fertilizer such. So the best dose of bokashi fertilizer that can be given is the dose of bokashi 1000 gr. Data analysis based on duncan test showing average growth of real different between all treatment given.



**Picture 1.** The Chart Is The Rate Of Increase In Height Of Stem Eggplant

## 2. The Diameter Of The Rod

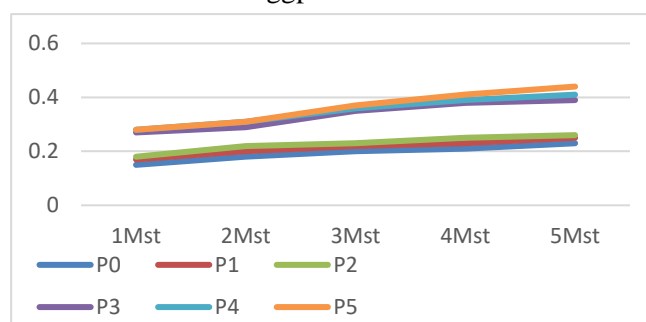
Based on the analysis of the data showed that administration of bokashi pig manure affect the magnitude of the diameter of the stem of a plant of eggplant (*Solanum melongena*). Where, the diameter of the rod is starting to look more clear on the measurements 3 weeks after planting. This happens because the bokashi pig manure that is given have already started to decompose so that it can be absorbed by the eggplant plants such. In line with the opinion of Kusuma (2015: 19) that organic fertilizer such as bokashi takes time to decompose so that the elements contained in it can be available for plants. The Diameter of the stem of a plant of eggplant (*Solanum melongena*) is big on granting the bokashi pig manure with a dose of 1000 gr (P5) and a significant effect on the measurement of 5 weeks after planting. Administration of a dose of bokashi 1000 gr (P5) will certainly increase the availability of nutrients to plants especially of the element nitrogen. This shows that the administration of bokashi dirt babidapat add the nutrient nitrogen in the soil so that it can stimulate the growth of the overall plant, especially the stem. Based on the analysis of the data showed that the influence of the provision of treatment bokashi pig manure on the magnitude of the diameter of the stem of a plant of eggplant (*Solanum melongena*). Table 2 shows the more dose of bokashi is given then the larger the diameter of the stem of the eggplant plants such. In line with the opinion of the Sutedjo (2002: 19) that if the needs of the nutrient nitrogen is fulfilled it will increase the growth of a plant.

**Table 2. The Observation Data stem Diameter of Eggplant Plants (*Solanum melongena*)**

Plk	The Diameter of the rod				
	1Mst	2Mst	3Mst	4Mst	5Mst
P0	0.15a	0.18a	0.20a	0.21a	0.23a
P1	0.17a	0.20a	0.22a	0.23a	0.25a
P2	0.18a	0.22a	0.23a	0.25a	0.26a
P3	0.27a	0.29a	0.35a	0.38a	0.39a
P4	0.28a	0.31a	0.36a	0.39a	0.41a
P5	0.28a	0.31a	0.37a	0.41a	0.44a

Description : Values in each column followed by the same letter indicate not significantly different by the test of LSD at  $\alpha$  0.05

Table 2 shows P0, P1, and P2 was not different with P3, P4, and P5, while Table 4 shows P0, P1, and P2, did not differ markedly with P3, P4, and P5. In line with the opinion of the Raksun (2017:48) that the treatment of 1000 gr bokashi give different results real with the control treatment and the treatment dose of the other. Through the analysis of the data on the duncan test showing average growth of real different between all treatment given. **Figure 2.** The Chart Is The Rate Of Increase In Stem Diameter Of Eggplant



**Figure 2.** The Chart Is The Rate Of Increase In Stem Diameter Of Eggplant

### 3. The Number Of Strands Of Leaf

Provision of bokashi pig manure can influence sum of leaves of eggplant plants (*Solanum melongena*). Wherein, the administration of a dose of bokashi different will affect the number of strands of leaves produced by plants of eggplant such. The amount of leaf blade can be seen more clearly in the measurements 3 weeks after planting for all the administered dose and look very clear on the measurement of 5 weeks after planting. This happens because the bokashi pig manure was

decomposed and can be easily absorbed by the plants of the eggplant so that it affects the amount of leaf blade of the crop of eggplant (*Solanum melongena*). Strands of the leaves of the plants of eggplant (*Solanum melongena*) given bokashi pig manure colored green and in general have the width of the leaves increased along with the increasing dosages of bokashi are given in comparison with the leaf blade of the eggplant plants are not given bokashi. This happens due to the content of the pig manure which is used as the basic material in the manufacture of bokashi is experiencing pengreduksian. In line with the opinion of the Raksun (2020: 61) that the organic material used as a raw material for making bokashi degraded into a variety of nutrient elements especially the elements of N, S, and P.

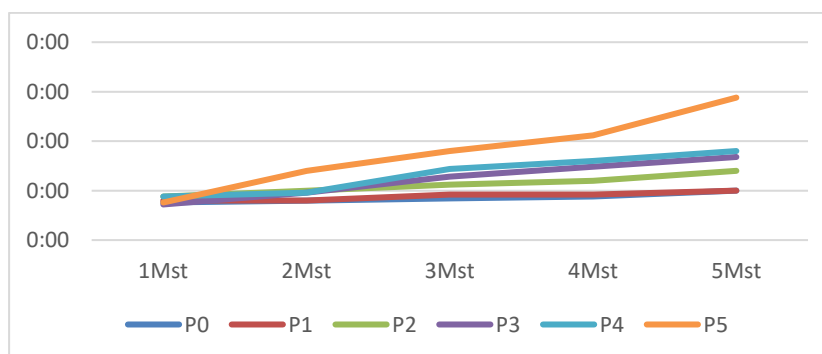
Administration of a dose of bokashi pig manure, 1000 gr (P5) on the measurement of 5 weeks after planting the more significant effect compared to administration of the dose of the other. As was the case in the height and diameter of stems of plants of eggplant (*Solanum melongena*), administration of a dose of bokashi 1000 gr (P5) gives the number of leaves that a lot more compared to the control treatment (without giving bokashi pig manure). This happens because of the high doses of bokashi pig manure gives the results greater to the amount of leaf blade because with regard to the role of nitrogen as a component of chlorophyll and phosphorus as a component of essential oils. In line with the opinion of the Kastalani (2017: 126) that the increase of the element nitrogen in the soil associated with the formation of chlorophyll in the leaves thus improving the process of photosynthesis which spurred the growth of the number of leaves of the plant and the element phosphorus as an essential component which plays an important role in photosynthesis and the absorption of ions and thus increase the number of leaves.

**Table3.** Data Observations the Number of Leaves stem Diameter of Eggplant Plants (*Solanum melongena*)

Plk	Jumlah helai daun				
	1Mst	2Mst	3Mst	4Mst	5Mst
P0	3.8a	4a	4.2a	4.4a	5a
P1	4a	4a	4.6a	4.6a	5a
P2	4.4b	5b	5.6b	6b	7b
P3	3.6b	4.8b	6.4b	7.4b	8.4b
P4	4.4b	4.8b	7.2b	8b	9b
P5	3.8a	7a	9a	10.6a	14.4a

Description : Values in each column followed by the same letter indicate not significantly different by the test of LSD at  $\alpha$  0.05

Table 3. Shows that more and more doses of bokashi given increasingly affect the growth of the number of strands of the leaves. The table shows P0 and P1 was not significantly different with the P5 but significantly different with P2, P3, and P4. P0, P1, P2, and P3 are not significantly different with the P5 but significantly different with P4. Through the analysis of the data on the duncan test showing average growth of real different between all treatment given.



**Picture 3.** The Chart Is The Rate Of Increase In The Number Of Leaves Of Eggplant

#### IV. CONCLUSION

Berdasarkan hasil analisis data yang menunjukkan bahwa efek pupuk bokashi pada pertumbuhan tanaman terong (*Solanum melongena*) baik pada tinggi tanaman, diameter batang dan jumlah tangkai daun. Pemberian dosis pupuk bokashi memberikan hasil yang lebih baik daripada tidak diberikan pupuk bokashi pada pertumbuhan tanaman terong (*Solanum melongena*). Pemberian dosis pupuk bokashi yang berbeda juga dapat mempengaruhi tingkat pertumbuhan yang berbeda-beda pada tanaman terong. Berdasarkan uji lanjut yang terdiri dari uji BNJ, BNT, dan Uji Duncan menunjukkan bahwa pemberian dosis pupuk bokashi 1000 gr memiliki pengaruh nyata terhadap pertumbuhan tanaman terong dibandingkan dengan perlakuan lainnya. Sehingga dapat disimpulkan bahwa pupuk bokashi dapat digunakan untuk mendukung pertumbuhan tanaman terong (*Solanum melongena*).

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