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THE IMPACT OF LIQUID ORGANIC FERTILIZER FROM TOFU WASTE AND TRICHOKOMPOS ON THE GROWTH AND YIELD OF SOYBEAN PLANTS (*GLYCINE MAX* L.) IN POLYBAGS IN ULTISOL

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ABSTRACT
Soybeans are a strategic food crop with a national demand level of 2.8 million tons/year and until now still depend on imports of up to 65%. This study aims to: (1) determine the effect of liquid organic fertilizer from tofu waste on the growth and yield of soybeans in ultisol planting media; (2) determine the effect of trichokompos on the growth and yield of soybeans in ultisol planting media; and (3) determine the effect of a combination of treatments on the growth and yield of soybeans in ultisol planting media. The study used a two-factor Randomized Block Design with three replications. The first factor was the provision of liquid organic fertilizer from tofu waste (T) consisting of: control (without liquid organic fertilizer from tofu waste) (T0), 100 mL/L/polybag (T1), 200 mL/L/polybag (T2), and 300 mL/L/polybag (T3). The second factor is the provision of trichocompost (K) fertilizer consisting of: control (without trichocompost fertilizer) (K0), 5 tons/ha = 25 g/polybag (K1), 10 tons/ha = 50 g/polybag (K2), and 15 tons/ha = 75 g/polybag (K3). The provision of tofu waste LOF can increase plant height, number of branches, number of filled pods, and weight of soybean pods. The best LOF tofu waste administration was obtained at a dose of 300 mL/L/polybag (T3). The provision of trichocompost fertilizer can increase plant height, number of branches, number of filled pods, and weight of soybean pods. The best trichocompost fertilizer administration was obtained at a dose of 75 g/polybag (K3). The interaction of tofu waste LOF and trichocompost fertilizer can increase the number of branches, number of filled pods, and weight of soybean pods. The best combination treatment for dry seed weight at T3K1 (300 mL LOF and 25 g trichocompost fertilizer).

KEYWORDS: Soybeans, ultisol, tofu waste, trichokompos.

INTRODUCTION
Ultisol that dominate ±30% of dry land in Indonesia face major challenges, namely high acidity (pH 4.0-5.5), low organic matter content (<2%), and limited availability of essential nutrients, especially phosphorus (P) and nitrogen (N).[1] These characteristics hamper the productivity of soybeans, which are strategic food crops with a national demand level of 2.8 million tons/year and until now still depend on imports of up to 65%.[2]

Soybeans can be processed into tofu, tempeh, milk and flour which aims to meet the needs of cheap protein for the community. Judging from the needs of soybeans, it can be made into 40% tofu, 50% tempeh and 10% soybean oil.[3] On the other hand, the tofu industry produces mass organic liquid waste (10-15 L/kg soybeans) which is rich in protein, calcium, and amino acids, but often pollutes the environment. Utilization of this waste as Liquid Organic Fertilizer (LOF) has the potential to solve two problems at once: increasing the fertility of Ultisol soil and reducing the ecological burden.[1;2] In line with the opinion of Karo et al.[4] which states that increasing the productivity of ultisol soil can be achieved by increasing the availability of nutrients and the chemical properties of the soil through the provision of organic fertilizer. Organic fertilizer can come from decomposition residues made by natural decomposers, such as microorganisms, from plant and animal waste.

Trichokompos (compost based on Trichoderma spp. inoculant) has also been shown to increase acid soil aggregation and nutrient availability through the mechanism of organic matter decomposition and soil pathogen inhibition.[1] Recent studies have shown that the combination of POC and compost can increase the

efficiency of nutrient absorption in soybeans on marginal land by up to 40% compared to single applications.[2;5]

Liquid tofu waste and trichokompos are organic fertilizers that can increase soil fertility. Liquid tofu waste is the remainder of the washing, soaking, coagulating, and printing processes during tofu making. Liquid tofu waste contains a lot of organic material. Liquid tofu waste contains 1.24% N, 5.54% P, 1.34% K and 5.80% C-Organic nutrients which are essential nutrients needed by plants.[6]

The organic content of tofu liquid waste includes carbohydrates, protein, fat, potassium and so on. Tofu liquid waste contains nutrients so that it has the potential to be developed as liquid fertilizer. It was found that plants that were flowed with tofu liquid waste such as banana plants, coconuts, and water hyacinths grew well. There were also some plants that died when passed by tofu liquid waste. To accelerate the manufacture of liquid organic fertilizer is to add EM-4 bioactivator because it contains fermentation microorganisms that can fertilize the soil and increase the availability of N in tofu waste.[7]

Trichokompos is an organic fertilizer in the form of compost that has the ability to prevent and protect plants from attacks by fungi that cause diseases transmitted through the soil. Trichokompos fertilizer is a combination of trichoderma and compost. Trichoderma functions as a decomposer of organic materials while increasing plant productivity. Compost also plays a very important role in the plant growth process. Compost not only adds nutrients, but also maintains soil function so that plants can grow well. In addition, trichokompos has the benefit of accelerating the decomposition process of organic materials such as straw, weeds, and others.[8]

Based on the description, this study aims to: (1) determine the effect of liquid organic fertilizer from tofu waste on the growth and yield of soybeans in ultisol planting media; (2) determine the effect of trichokompos on the growth and yield of soybeans in ultisol planting media; and (3) determine the effect of a combination of treatments on the growth and yield of soybeans in ultisol planting media.

MATERIALS AND METHODS

The research was conducted in the experimental field of the Faculty of Agriculture Universitas Islam Sumatera Utara, Jalan Karya Wisata, Gedung Johor Village, Medan Johor District, Medan City, North Sumatra Province at an altitude of + 25 meters above sea level with flat topography.

The study used a two-factor Randomized Block Design with three replications. The first factor was the provision of liquid organic fertilizer from tofu waste (T) consisting of: control (without liquid organic fertilizer from tofu waste) (T0), 100 mL/L/polybag (T1), 200 mL/L/polybag (T2), and 300 mL/L/polybag (T3). The second factor was the provision of trichokompos fertilizer (K) consisting of: control (without trichokompos fertilizer) (K0), 5 tons/ha = 25 g/polybag (K1), 10 tons/ha = 50 g/polybag (K2), and 15 tons/ha = 75 g/polybag (K3).

Liquid organic fertilizer from tofu waste is made in a simple way, namely liquid tofu waste is put into a 15 L bottle. Then 400 g of brown sugar is dissolved by adding 500 mL of water, then left to cool. After that, add 100 mL of brown sugar and EM4 liquid into the bottle containing the tofu waste liquid, then shake it slowly until evenly mixed. Then the bottle is tightly closed and a hose is inserted to connect the bottle of liquid tofu waste, brown sugar, and EM4 mixture with the bottle containing water. After 15 days, the liquid organic fertilizer from tofu waste can be used.

Before planting, the soil and fertilizer were analyzed for their content first. The analysis of the content of ultisol soil, namely pH, Percent C-Organic, N, P (P-Available), K, and P2O5 (P-Total). Then the analysis of the content of liquid organic fertilizer of tofu waste, namely N, P, and K. Analysis of soil and LOF of tofu waste was carried out at BSIP North Sumatra, Medan.

The planting medium used is ultisol soil taken from Mancang Village, Selesai District, Langkat Regency, North Sumatra. Ultisol soil is put into 10 kg polybags and arranged with a distance between polybags of 20 cm, a distance between samples of 30 cm, and a distance between replications of 50 cm.

Trichokompos fertilizer is applied 2 weeks before planting and given according to each treatment level. Trichokompos fertilizer is sprinkled evenly on each polybag. While liquid organic fertilizer from tofu waste is applied 3 days before planting and watered on each polybag according to the treatment level.

Soybean seed selection activities are carried out by soaking. The seeds that are taken and will be planted are the seeds that sink. While the seeds that float indicate that the seeds will not grow and are not good for planting. Seed selection aims to ensure that the soybean seeds used are quality seeds. Seed selection is a factor in success in plant cultivation. Good and quality seeds can increase production and reduce the failure rate. In addition, seeds can also reduce pest and disease attacks that can reduce plant production.

The soybean seeds planted were the Dega 1 variety. Planting activities were carried out in the afternoon. Before planting, the plot was watered or moistened first. Then the selected seeds were planted 2-3 grains in each polybag with a planting hole depth of + 3 cm. The planted seeds were watered again.

The variables observed were plant height, number of productive branches, number and weight of filled pods.

RESULTS

Plant Height (cm)

From the observation data and analysis of variance, it is known that the provision of liquid organic fertilizer (LOF) of tofu waste has a significant effect on the height of soybean plants. Likewise, the provision of trichokompos fertilizer has a significant effect on the height of soybean plants. However, the combination of LOF tofu waste and trichokompos fertilizer has no significant effect on plant height. The results of the average difference test for the provision of LOF Tofu Waste and Trichokompos fertilizer on plant height at the age of 3 weeks after planting (WAP) can be seen in Table 1.

Table 1: Soybean plant height (cm) at 3 WAP with various doses of tofu waste LOF and trichocompost.

Treatments	Trichokompos Fertilizer (K) (ton/ha)				Average (T)
	0 (K0)	5 (K1)	10 (K2)	15 (K3)	
LOF Tofu Waste (T) (mL/plant)					
0 (T0)	21.17	23.67	24.33	23.83	23.25 b
100 (T1)	24.17	23.50	23.00	23.67	23.58 b
200 (T2)	25.17	24.50	27.17	28.00	26.21 a
300 (T3)	23.33	25.83	27.67	28.67	26.38 a
Average (T)	23.46 c	24.38 bc	25.54 ab	26.04 a	

Description: Numbers in the same column followed by different letters indicate significant differences at the 5% level based on Duncan's test.

In Table 1 above, it can be seen that the provision of tofu waste LOF has a significant effect on the height of soybean plants at the age of 3 weeks after planting. The highest plant height was obtained in the treatment of providing tofu waste LOF 300 mL/L/polybag (T3) which was 26.38 cm which was significantly different from without LOF (T0) which was 23.25 cm and also significantly different from LOF 100 mL/L/polybag (T1) which was 23.58 cm. Meanwhile, with T2 (200 mL/L/polybag) there was no significant difference in plant height. Based on the above, it can be said that the provision of tofu waste LOF gave a positive response to the height of soybean plants.

This can be explained that from the results of the LOF analysis, N 0.11%, P_2O_5 0.08%, and K_2O 0.14% can affect plant height. It is suspected that the provision of tofu waste LOF with a dose of 300 mL/L/polybag can provide sufficient nutrients for the needs and development of soybean plants. The presence of nutrients in this LOF, especially N, is very much needed by plants for the synthesis of amino acids and proteins, especially at plant growth points so that it accelerates the plant growth process such as cell division and cell elongation, thereby increasing plant height. Nitrogen is very much needed, especially at plant growth points such as root tips, stems, and leaves, because this is where cell division and cell elongation occur, which are important for plant height growth.[9]

N is a major component in plant cell structures, including proteins, nucleic acids (DNA and RNA), and enzymes. Proteins and nucleic acids are essential for cell growth and development, while enzymes play a role in various metabolic reactions.[10;11] N is also a major component of chlorophyll, a pigment required for photosynthesis. With sufficient nitrogen availability, plants can photosynthesize more efficiently, producing more energy in the form of sugars, which are used for growth.[10]

The treatment of trichokompos fertilizer also had a significant effect on the height of soybean plants at 3 WAP. The highest plant height was obtained in the K3 treatment (75 g/polybag) which was 26.04 cm which was significantly different from the K0 treatment (without fertilizer) which was 23.46 cm, and was also significantly different from the K1 treatment (25 g/polybag) which was 24.38 cm, but not significantly different from the K2 treatment (50 g/polybag) which was 25.54 cm.

Organic materials contained in trichocompost can improve the physical, chemical and biological properties of the soil. Improvement of physical properties of the soil includes soil structure, increasing water holding capacity, and improving soil aeration and drainage. Improvement of biological properties of the soil includes increasing the activity of microorganisms in the soil. The results of research by Ardian et al.[12] showed that the provision of corn litter trichocompost can increase the growth of soybean plants. This is because the provision of corn litter trichocompost can improve the physical properties of the soil such as soil structure, water holding capacity, and soil aeration and drainage.

Compost fertilizer helps loosen the soil, improve soil structure, and make the soil easier to work[13], increases water retention in the soil, so that plants can access water more easily, especially during the dry season, increases soil aeration (the amount of air space in the soil) and drainage (the ability of the soil to drain water), which is important for plant root growth[14], and also contains various important nutrients for plants, such as N, P, and K, as well as microelements, which can help improve growth and crop yields.[15]

The interaction of LOF tofu waste and trichocompost fertilizer in Table 1 has no significant effect on the height of soybean plants. However, when viewed from the highest result data, there is a tendency for an increase

in plant height in the T3K3 treatment (300 mL/L/polybag LOF + 75 g trichocompost fertilizer/polybag), which is 28.67 cm, and the lowest in the T0K0 treatment (without LOF and without fertilizer), which is 21.17 cm. In this case, although the results of the study showed that the interaction of the two factors was not significantly different, there was also a positive relationship in increasing plant height. It can be said that the administration of LOF tofu waste accompanied by trichocompost fertilizer will support each other, because trichocompost fertilizer as an organic material that can improve the biological properties of the soil which will ultimately also improve the physical properties of the soil. With good physical properties, it will help the roots to absorb nutrients from the soil. Meanwhile, LOF produces gibberellin plant growth regulators (PGR) to stimulate plant growth.

Number of Productive Branches (branches)

From the observation data and analysis of variance, it is known that the provision of LOF tofu waste has a significant effect on the number of branches. Likewise, the provision of trichokompos fertilizer has a significant effect on the number of branches. The combination of the provision of LOF tofu waste and trichokompos fertilizer also has a significant effect on the number of branches. The results of the mean difference test of the provision of LOF tofu waste and trichokompos fertilizer on the number of branches can be seen in Table 2.

Table 2: Number of productive branches (branches) of soybeans in 3 WAP with various doses of LOF of tofu waste and trichocompost.

Treatments	Trichokompos Fertilizer (K) (ton/ha)				Average (T)
	0 (K0)	5 (K1)	10 (K2)	15 (K3)	
LOF Tofu Waste (T) (mL/plant)					
0 (T0)	3.50 e	4.50 cd	5.83 a	4.83 c	4.67 b
100 (T1)	4.50 cd	4.33 d	5.00 bc	5.17 b	4.75 b
200 (T2)	4.17 d	5.17 b	5.00 bc	5.67 ab	5.00 ab
300 (T3)	5.33 ab	5.50 ab	4.50 cd	5.83 a	5.29 a
Average (T)	4.38 b	4.88 ab	5.08 a	5.38 a	

Description: Numbers in the same column followed by different letters indicate significant differences at the 5% level based on Duncan's test

Table 2 shows that the provision of tofu waste LOF significantly affected the number of soybean branches. The highest number of branches was obtained in the treatment of tofu waste LOF 300 mL/L/polybag (T3), which was 5.29 branches, which was significantly different from without LOF (T0), which was 4.67 branches, and also significantly different from LOF 100 mL/L/polybag (T1), which was 4.75 branches. Meanwhile, with T2 (200 mL/L/polybag) there was no significant difference between treatments T1 and T0. This can be explained that the nutrients in LOF (N 0.11%, P_2O_5 0.08%, and K_2O 0.14%) can affect the number of soybean branches. It is suspected that the provision of tofu waste LOF with a dose of 300 mL/L/polybag can provide sufficient nutrients for the needs and development of soybean plants. The provision of tofu waste LOF provides significant benefits for plant growth, both directly and indirectly. LOF is rich in essential nutrients such as N, P, and K, and contains microorganisms that are beneficial to the soil. LOF also helps improve soil structure, making it looser, so that plant roots can develop better and absorb more nutrients.[16]

The treatment of trichocompost fertilizer also had a significant effect on the number of branches. The highest number of plant branches was obtained in the K3 treatment (75 g/polybag), which was 5.38 branches, which was significantly different from the K0 treatment (without fertilizer), which was 4.38 branches. However, it was not significantly different from the K1 treatment (25 g/polybag), which was 4.88 branches and from the K2 treatment (50 g/polybag), which was 5.08 branches. This is because the higher the dose of trichocompost given, the higher the availability of nutrients in the soil, so that it can increase the increase in the number of plant branches. This can be explained that the macro and micro nutrients in the fertilizer play an important role in increasing the number of branches in plants. Macro nutrients such as N, P, and K, as well as micro nutrients such as Fe, Cu, and Zn, are all needed by plants for growth and development, including branch formation.[17] In addition, compost fertilizer also functions to increase the availability of nutrients in the soil. The availability of sufficient nutrients allows plants to grow stronger, increase photosynthesis, and trigger branch formation.[18] Lingga[19] stated that the ability of pure organic fertilizer, even though the quantity is very small, is able to provide a large influence on the soil which is useful for increasing productivity, accelerating, stimulating the growth of roots, stems, leaves and flowers.

The interaction of LOF tofu waste and trichocompost fertilizer in Table 2 significantly affected the number of soybean plant branches. The highest number of plant branches was in the T3K3 treatment (300 mL LOF and 75 g trichocompost fertilizer), which was 5.83 branches and the lowest in the T0K0 treatment (without fertilizer), which was 3.50 branches. In this case, there was an increase in the number of branches by 39.79%. These results indicate that the administration of LOF tofu waste and trichocompost fertilizer has provided a synergistic

response to the growth of the number of soybean plant branches. As is known, the administration of LOF tofu waste and trichocompost fertilizer provides a significant response when combined with plant growth

Number of Filled Pods (pods)

From the observation data and analysis of variance, it is known that the provision of LOF tofu waste has a significant effect on the number of filled pods. Likewise, the provision of Trichokompos fertilizer has a significant effect on the number of filled pods. The combination of the provision of LOF tofu waste and trichokompos fertilizer also has a significant effect on the number of filled pods. The results of the mean difference test of the provision of LOF Tofu Waste and Trichokompos fertilizer on the number of filled pods can be seen in Table 3.

Table 3 shows that the provision of tofu waste LOF significantly affected the number of pods containing soybean plants. The highest number of pods containing was obtained in the treatment of 300 mL/L/polybag tofu waste poc (T3), which was 48.63 pods, which was significantly different from without LOF (T0), which was 36.29 pods and also significantly different from LOF 100 mL/L/polybag (T1), which was 43.46 pods. Meanwhile, with T2 (200 mL/L/polybag) there was no significant difference in all treatments.

Table 3: Number of pods containing soybeans (fruit) with various doses of tofu waste LOF and trichocompost.

Treatments	Trichokompos Fertilizer (K) (ton/ha)				Average (T)
	0 (K0)	5 (K1)	10 (K2)	15 (K3)	
LOF Tofu Waste (T) (mL/plant)					
0 (T0)	33.00 f	36.33 e	39.17 de	36.67 e	36.29 c
100 (T1)	41.00 d	44.83 c	40.00 d	48.00 b	43.46 b
200 (T2)	46.17 bc	46.83 bc	48.83 b	48.83 b	47.67 a
300 (T3)	47.67 bc	45.17 c	47.67 bc	54.00 a	48.63 a
Average (T)	41.96 b	43.29 b	43.92 b	46.88 a	

Description: Numbers in the same column followed by different letters indicate significant differences at the 5% level based on Duncan's test

This can be explained that the nutrients in LOF (N 0.11%, P2O5 0.08%, and K2O 0.14%) can affect the number of pods containing plants. It is suspected that the provision of LOF tofu waste with a dose of 300 mL/L/polybag can provide sufficient nutrients for the needs and development of soybean plants. The percentage of pods is greatly influenced by the availability of P and K because the P element plays a very important role in the flowering process, the more flowers formed, the more pods, while K is useful for plants during pod formation and pod filling.[20]

The treatment of trichocompost fertilizer also had a significant effect on the number of filled pods. The highest number of filled pods was obtained in the K3 treatment (75 g/polybag), which was 46.88 pods, which was significantly different from the K0 treatment (without fertilizer), which was 41.96 pods, significantly different from the K1 treatment (25 g/polybag), which was 43.29 pods and from the K2 treatment (50 g/polybag), which was 43.92 pods. This is because trichocompost contains microorganisms, especially *Trichoderma sp*., which play an important role in increasing plant growth and yields. *Trichoderma sp*. helps in the process of breaking down organic matter in the soil, increasing the availability of nutrients for plants, and protecting plants from soil-borne diseases. In addition, trichocompost fertilizer also provides nutrients needed by plants, such as N, P, and K, which are important for the growth and development of soybean pods.[21;22]

The interaction of LOF tofu waste and trichocompost fertilizer in Table 3 significantly affected the number of filled pods. The highest number of filled pods was in the T3K3 treatment (300 mL LOF and 75 g trichocompost fertilizer), which was 54.00 pieces and the lowest in the T0K0 treatment (without fertilizer), which was 33.00 pieces. In this case, there was an increase in the number of pods by 38.89%. This is because both provide essential nutrients and improve soil quality. LOF tofu waste provides additional nutrients, while trichocompost fertilizer, with environmentally friendly microbial content, helps increase soil fertility and nutrient availability for soybean plants, thereby increasing the number of filled pods.[23]

LOF tofu waste is a source of additional nutrients, especially N, P, and K which are important for the growth and development of soybeans and increase the organic content of the soil, which is important for water and nutrient retention[23], while trichocompost can increase soil fertility by providing beneficial microbes, such as bacteria and fungi, which help the process of breaking down organic nutrients and increasing nutrient absorption by plants, as well as helping to improve soil structure, so that it is better at providing water and nutrients for plants.[14] The combination of LOF tofu waste and trichocompost fertilizer can provide a synergistic effect, where LOF provides a direct source of nutrients and trichocompost fertilizer helps increase the absorption of these nutrients. This interaction can also increase soil biodiversity, which is important for maintaining the balance of the soil ecosystem.[23]

Weight of Filled Pods (g)

Observation data and analysis of variance showed that the provision of LOF tofu waste had a significant effect on the weight of filled pods. Likewise, the provision of Trichokompos fertilizer had a significant effect on the weight of filled pods. The combination of the provision of LOF tofu waste and trichokompos fertilizer also had a significant effect on the weight of filled pods. The results of the average difference test of the provision of LOF Tofu Waste and Trichokompos fertilizer on the weight of filled pods can be seen in Table 4.

Table 4: Weight of pods containing (g) soybeans with various doses of tofu waste LOF and trichocompost.

Treatments	Trichokompos Fertilizer (K) (ton/ha)				Average (T)
	0 (K0)	5 (K1)	10 (K2)	15 (K3)	
LOF Tofu Waste (T) (mL/plant)					
0 (T0)	48.67 f	57.33 e	74.33 c	87.17 a	66.88 b
100 (T1)	61.17 d	65.83 d	70.67 c	86.83 a	71.13 b
200 (T2)	71.50 c	65.67 d	87.17 a	79.50 b	75.96 a
300 (T3)	73.17 c	85.33 a	74.50 c	74.83 bc	76.96 a
Average (T)	63.63 d	68.54 c	76.67 b	82.08 a	

Description: Numbers in the same column followed by different letters indicate significant differences at the 5% level based on Duncan's test

Table 4 shows that the provision of tofu waste LOF significantly affected the weight of soybean pods. The highest weight of filled pods was obtained in the treatment of 300 mL/L/polybag tofu waste poc (T3), which was 76.96 g, which was significantly different from without LOF (T0), which was 66.88 g and also significantly different from 100 mL/L/polybag LOF (T1). which was 71.13 g. It is suspected that the provision of tofu waste LOF with a dose of 300 mL/L/polybag can provide sufficient nutrients for the needs and development of soybean plants. Tofu waste LOF contains various important nutrients, such as N, P, K, and other nutrients. These nutrients are very much needed by plants for growth and development, especially in the vegetative and generative phases.[24;25]

Pod enlargement and soybean seed filling do require a lot of K. This nutrient plays an important role in the metabolic process, especially in the formation and filling of soybean seeds.[26] K is needed by plants for the formation of sugar and starch, in addition to the potassium element which is an activator of a large number of enzymes that are important for the photosynthesis process, in addition to helping in the formation of starch and protein.[27] In addition to K, other nutrients such as P are also important in the growth phase of soybeans, especially during the formation of pods and seeds.[28]

The treatment of trichocompost fertilizer also had a significant effect on the weight of filled pods. The highest weight of filled pods was obtained in the K3 treatment (75 g/polybag), which was 82.08 g, which was significantly different from the K0 treatment (without fertilizer), which was 63.63 g, also significantly different from the K1 treatment (25 g/polybag), which was 68.54 g and from the K2 treatment (50 g/polybag), which was 76.67 g. From the results of the study on the administration of trichocompost fertilizer on the weight of filled pods, it was found that the administration of trichocompost fertilizer up to a dose of 75 g/polybag was the highest and significantly different from without trichocompost fertilizer. In this case, there was an increase in the weight of filled pods by 22.48%. This is because organic matter can improve the physical properties of the soil, including soil aggregates that cause the soil structure to become crumbly. The crumbly soil structure can help root development so that it can increase the absorption of nutrients available in the soil optimally which can be utilized by plants for growth, including seed filling so that seed weight increases. According to Ardian et al.[12], organic materials can make the soil loose so that plant root development is more optimal.

The interaction of LOF tofu waste and trichocompost fertilizer in Table 4 significantly affected the weight of filled pods. The highest weight of filled pods was in the T3K3 treatment (300 mL LOF and 75 g trichocompost fertilizer), which was 87.17 g and the lowest in the T0K0 treatment (without fertilizer), which was 48.67 g. In this case, there was an increase in pod weight of 44.17%. These results indicate that the administration of LOF tofu waste and trichocompost fertilizer has provided a synergistic response to the growth of the weight of filled pods. As is known, the administration of LOF tofu waste and trichocompost fertilizer provides a significant response when combined with plant growth.

CONCLUSION

The application of LOF of tofu waste can increase plant height, number of branches, number of filled pods, and weight of soybean pods. The best application of LOF of tofu waste was obtained at a dose of 300 mL/L/polybag (T3).

Application of trichocompost fertilizer can increase plant height, number of branches, number of filled pods, and weight of soybean pods. The best application of trichocompost fertilizer was obtained at a dose of 75 g/polybag (K3).

The interaction of LOF of tofu waste and trichocompost fertilizer can increase the number of branches, number of filled pods, and weight of soybean pods. The best combination treatment for dry seed weight at T3K1 (300 mL LOF and 25 g trichocompost fertilizer).

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