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Application of Planting Media Composition and Liquid Organic Mushroom Fertilizer Concentration Eternal Luck (JAKABA) on the Growth and Yield of Purple Eggplant (*Solanum melongena* L.)

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Abstract

The quality of the growing medium and nutrient availability influence eggplant growth and production. This study aimed to determine the effects of different growing media combined with varying concentrations of liquid organic fertilizer on the growth and yield of eggplant (*Solanum melongena* L.). A completely randomized design (CRD) with two factors was used: planting media (soil; soil and rice husk charcoal 1:1; soil and goat manure 1:1; soil, rice husk charcoal, and goat manure 1:1:1) and Jakaba POC concentration (15, 30, 45, and 60 ml/L). The results showed a significant interaction between the planting media and Jakaba POC on plant height, number of leaves at 28-35 days after planting (DAP), and the number of fruits per plant. The best treatment was the combination of soil, rice husk charcoal, and goat manure (1:1:1) with 60 ml/L Jakaba POC. The planting medium significantly affected plant height and leaf number at 21, 42, and 49 DAP, as well as fruit weight per plant, while Jakaba POC influenced leaf number at 21, 42, and 49 DAP and fruit weight per plant. The combination of organic planting media with Jakaba POC enhanced eggplant growth and yield, particularly plant height, leaf number, and fruit number. Based on these results, the combination of soil, rice husk charcoal, and goat manure with 60 ml/L Jakaba POC is recommended as an optimal treatment to improve eggplant growth and production by utilizing organic materials that enhance soil physical, chemical, and biological properties.

Keywords: Cultivation Substrate, Fertilization Efficiency, Horticultural Nutrition, Organic Farming, Vegetable Productivity

1. Introduction

Eggplant (*Solanum melongena* L.) is a very popular vegetable among many people because of its delicious taste and its use as a food supplement. Eggplant plants offer various benefits for the body's health because they contain many vitamins and nutrients, including vitamin B-complex, Thiamin, Pyridoxine, Riboflavin, Iron, Phosphorus, Magnesium, and Potassium. According to Sunarjono (2013), every 100 g of raw eggplant contains 26 calories; 1 g of protein; 0.04 g of vitamin B; and 5 g of vitamin C. Eggplant production in Indonesia in 2022 was around 691,738 tons/ha. This production amount has increased compared to 2021, when it was around 676,339 tons/ha, an increase of only 2.27%. Although eggplant production

tends to increase each year, it remains relatively low in Indonesia. Low eggplant production is caused by various factors, one of which is an infertile planting medium.

The growing medium is a crucial factor in determining eggplant productivity. Its function is to provide a growth medium for the plant and store the nutrients and water needed for growth. Supporting physiological processes in plants (Herliana et al., 2018). Selecting the appropriate growing medium is crucial in eggplant cultivation to ensure optimal plant growth. Selecting the right growing medium is crucial for optimal eggplant growth. Eggplant plants require good soil chemical and physical properties to support their growth. Eggplant plants require a medium that retains water, has good aeration and drainage, has an

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appropriate pH, and is rich in nutrients. A crumbly, loose growing medium is also crucial for root growth, as it indicates a high organic matter content (Musthafa, 2022).

Organic-based growing media such as compost, rice husk charcoal, and manure are widely used in polybag cultivation. These organic materials can improve the physical structure of the growing medium, increase porosity and water retention, and provide essential nutrients needed by plants. One growing medium that can be used is goat manure. Goat manure improves soil aeration, increases the soil's ability to retain nutrients, increases water retention capacity, increases soil buffering capacity, provides energy for soil microorganisms, and serves as a source of nutrients. Goat manure contains the element N, which can promote the growth of organs involved in photosynthesis, namely leaves (Dewi, 2018). Nurlailah et al. (2023) reported that goat manure has a relatively higher potassium content and lower water content than other types of fertilizer, while N and P levels are relatively similar. The C/N ratio of goat manure is generally still above 30. Good manure should have a C/N ratio below 20, so goat manure must be fermented. (Nurlailah et al., 2023)

Musthafa's research (2022) reported that the addition of manure and rice husk charcoal can increase the number and weight of fruit eggplant; meanwhile, Murtianda et al. (2022) stated that rice husk charcoal significantly affected fruit length, and manure increased the number and weight of fruit. Other research by Amane and Afmir (2024) and Kolo and Rahajo (2016) confirms the role of charcoal Rice husks in improving the physical and biological properties of the growing medium, while Haris et al. (2024) showed that a combination of soil, rice husk charcoal, and manure is the best composition for eggplant growth. However, these studies generally still focus on the physical and chemical aspects of the growing medium, without considering the role of biological liquid organic fertilizer. This research provides an update by integrating a combination of organic growing media (soil, rice husk charcoal, and manure) with goats, together with organic liquid fertilizer Jakaba, which contains active microbes, so it is expected to produce a synergistic interaction between solid and liquid nutrients in increasing the growth and yield of Mustang F1 purple eggplant plants more efficiently and sustainably. (Abdillah et al., 2023) shows that the treatment of goat manure dosage has different effects on the parameters of leaf area, number of leaves, and number of flowers of eggplant plants. In the leaf area parameter, the best manure dosage is 200 g/plant, which is 540.25 cm², while in the parameters of the number of leaves and the number of flowers, the best manure dosage is 300 g/plant, which is the number of leaves as many as 11.16 strands and the number of flowers as many as 2.39 buds in 2 months. Vegetative and generative improvements can be achieved by adding a combination of planting media, including rice husk charcoal.

Rice husk charcoal has a pH (H₂O) content of 5.15; P (total) and K (total) content of 1.83% and 1.48% respectively; organic C 18.45%; and total N content 1.07% with C/N ratio is 17.24 (Harahap et al., 2020) Rice husk charcoal has crumbly properties so that air, water, and roots can easily enter the soil fraction and can bind water. This finding is very important for plant roots because the growing medium closely influences root growth and properties (Irawan, 2015). Soil media added with rice husk charcoal can improve the porosity of the media so that it is good for root respiration, can maintain soil moisture, because when rice husk charcoal is added to the soil it will be able to bind water, then released into the micro pores to be absorbed by plants and encourage the growth of microorganisms that are useful for the soil and plants (Kusmarwiyah & Erni, 2011). In addition to providing the best planting media, plants need to be given additional fertilizer to increase vegetative and generative growth

Follow-up fertilization is carried out after applying base fertilizer during soil preparation. This activity serves to supplement nutrients not provided by the initial fertilization and to adjust the plant's nutritional needs to its growth phase, thereby supporting optimal plant growth and development. (Prabowo. & Subantoro, 2013). One option for fertilizer follow-up is to use organic liquid fertilizer Jakaba.

Previous research has shown the potential of Jakaba liquid organic fertilizer (POC) to increase plant growth, but with varying results depending on the type of plant and environmental conditions. Research by Risman (2022) showed that applying Jakaba POC at 20 ml/L produced the best results for all growth parameters in katokkon chili plants. Yusuf and Junaed (2021) found that a dose of 300 ml/L on coffee plants did not have a statistically significant effect, but visually increased plant height and leaf number. Research by Apriyanto et al. (2023) reported that the application of 40 ml/L Jakaba POC to bok choy significantly increased leaf length and plant height, while Waworuntu (2023) reported an increase in the number of leaves in sorghum plants at a dose of 100 ml/L. Farhanah et al. (2024) showed that combining Jakaba POC with 50% NPK fertilizer significantly increased the height, number of leaves, root volume, and fresh weight of red lettuce plants. Meanwhile, Norliyani et al. (2023) noted that Jakaba POC had no significant effect on red chili cultivation on podzolic land due to the soil's lower fertility. In contrast to these studies which generally emphasize the single effect of Jakaba POC on various types of plants, this study is an update because it combines the composition of organic planting media (soil, rice husk charcoal, goat manure) with various concentrations of Jakaba POC (15–60 ml/L) in a factorial manner to observe the synergistic interaction between solid media and liquid fertilizer on the growth and yield of purple eggplant plants of the Mustang F1 variety.

Jakaba POC contains high levels of Nitrogen (N) and

Phosphorus (P), which are beneficial for vegetative growth and stimulate root growth. (Waworuntu, 2023) Jakaba POC from rice washing water (leri water) contains phosphorus, vitamin B1 (thiamine), and vitamin B12, and contains the nutrients N, P, K, and C. (Rahmawati et al., 2023) Research results (Farhanah et al., 2024) show that giving fertilizer, combined with Jakaba with NPK, gives a real effect on increasing height (17.02 cm), number of leaves (8.90 pieces), root volume (3.11 ml), and fresh weight of lettuce plants (50.2 gr)—red vertical farming. Provision fertilizer Jakaba at up to 50% combined with NPK at up to 1 gram per plant; this is effective in increasing the fresh weight of lettuce plants in red vertical farming.

Based on the description, this study aims to examine the effect of the combination of planting media and variations in the concentration of liquid organic fertilizer on the growth and yield of eggplant (*Solanum melongena* L.), with a focus on the parameters of plant height, number of leaves, total number of fruits, and total fruit weight as indicators of successful cultivation.

2. Material and Methods

2.1. Place and Time

This research will be conducted in the experimental field of the Faculty of Agriculture, UPN “Veteran” East Java, Gunung Anyar District, Surabaya City, East Java which is located at an altitude of ± 5 meters above sea level with the lowest to highest temperature of 25°C-31°C and air humidity between 50-80% with the coordinates of this research location at 7°20'03"S 112°47'30"E. This research will be conducted over 4 months, namely October 2024 to January 2025.

2.2. Tools and materials

The tools used in this research include shovels, measuring cups, 5-liter buckets, watering cans, sprayers, white cloth, rulers, meters, measuring tapes, calipers, scissors, digital scales, 15x15 cm polybags, 40x40 cm polybags, labels, and stakes. The materials to be used are purple eggplant seeds of the Mustang F1 variety, POC Jakaba made itself, NPK Mutiara 16:16:16 fertilizer, ZA fertilizer, ZK fertilizer, soil, rice husk charcoal, goat manure, and water. The following is a diagram of the work procedures for implementing the research (Figure 1).

2.3. Research Design

This study used a completely randomized design (CRD) with two factors. The first factor was the composition of the planting medium, which consisted of soil as a control, a mixture of soil and rice husk charcoal with a ratio of 1:1 (v/v), a mixture of soil and goat manure with a ratio of 1:1 (v/v), and a mixture of soil, rice husk charcoal, and goat manure with a ratio of 1:1:1 (v/v/v). second is Jakaba POC concentrations included 15 ml/L, 30 ml/L, 45 ml/L, and 60 ml/L. Each treatment combination

was repeated three times, and each experimental unit consisted of three plants.

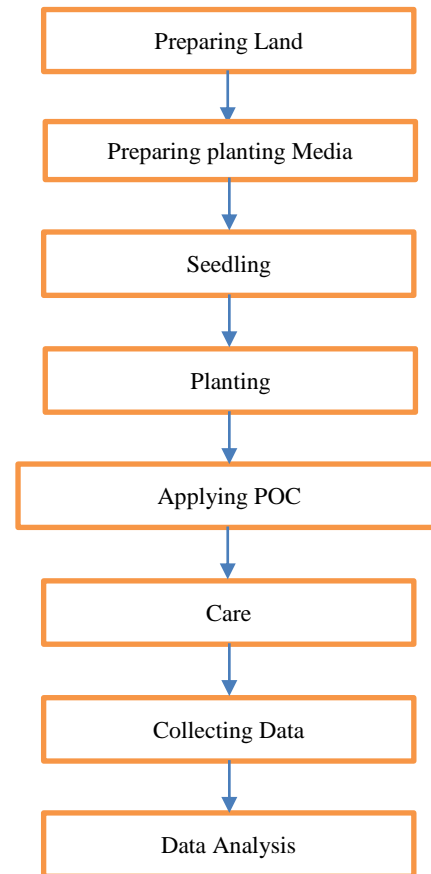


Figure 1. Flowchart of research implementation

Observed parameters are as follows:

2.3.1. Plant Height (cm)

Eggplant plant height is measured from the soil surface to the growing point. Measurements can be made with a ruler or tape measure, depending on the height of the eggplant plant. Plant height measurements begin at 14 days after transplanting (DAP) and continue until 56 DAP at 7-day intervals.

2.3.2. Number of leaves (blades)

Leaf counts were measured by manually counting the number of fully opened leaves per plant. Leaf counts began at 14 days after transplanting (DAP) and continued until 56 DAP, with 7-day intervals.

2.3.3. Total Number of Fruits Per Plant (fruits)

Observations were conducted by calculating the total harvest and the number of fruits per plant, which were determined by counting the fruits on each sample plant across the first to fifth harvest periods. Harvesting was carried out every 2-3 days.

2.3.4. Total Fruit Weight Per Plant (grams)

The fresh weight of fruit per plant is calculated by

adding all fruit harvested across all periods for each plant, which is measured using a scale.

Procedure Jakaba POC manufacturing is done through the following diagram procedure;

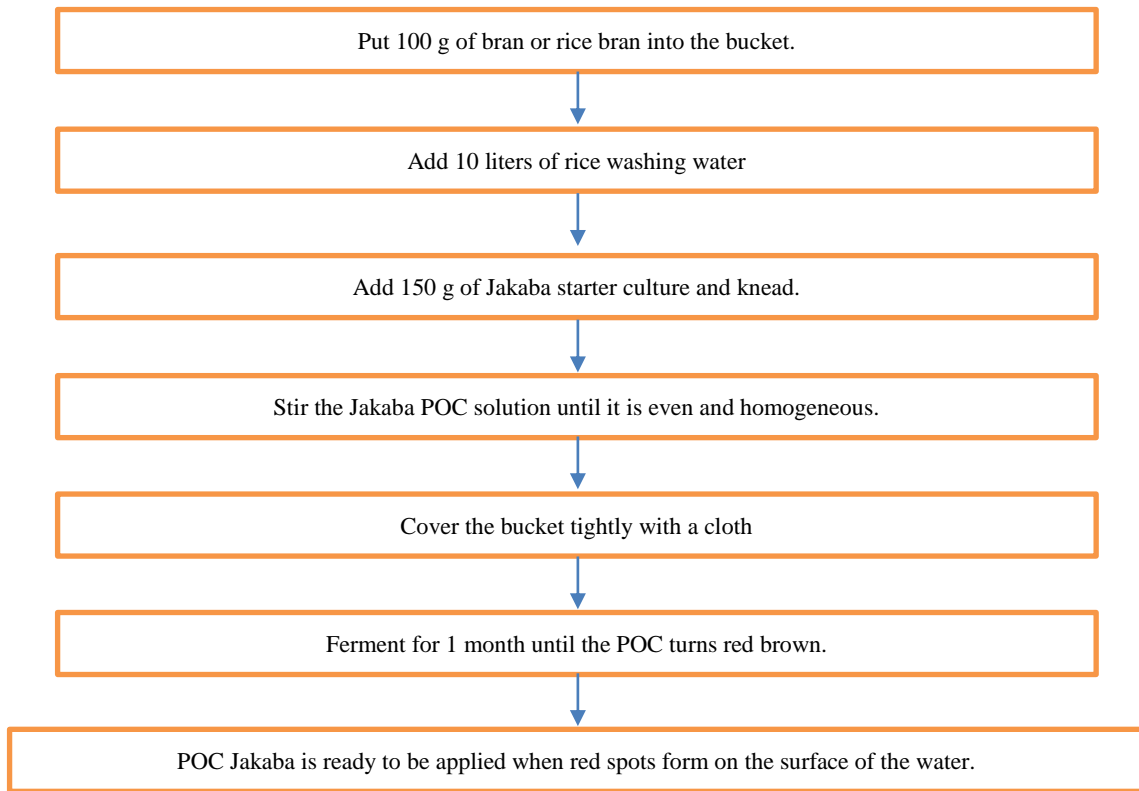


Figure 2. Jakaba POC manufacturing flow diagram.

2.4. Data analysis

Observational data were analyzed using analysis of variance (ANOVA). If a significant or highly significant effect was found, an Honestly Significant Difference (HSD) test was performed at the 5% level to determine differences between treatments. The analysis was performed using IBM SPSS Statistics 25.

showed a significant interaction between planting media and Jakaba POC on eggplant plant height at 28 and 35 days after planting. The single treatment of planting media had a very significant effect on plant height at 21 and 42 days after planting, and was significantly different at 49 days after planting. The single treatment of Jakaba POC concentration had a significant effect on plant height at 21 days after planting and a very significant effect at 42 and 49 days after planting. The average eggplant plant height for the combination is presented in Table 1.

3. Results and Discussion

3.1. Plant Height

The results of the analysis of variance (ANOVA)

Table 1. Average Height of Eggplant Plants Due to Different Combination Treatments in the Media Planting and Concentration of Jakaba POC at the Age of 28 and 35 HST

Age	Planting Media Treatment	Plant Height (cm)							
		POC concentration (ml/L)							
		15		30		45		60	
28 HST	T	15.73±0.49	a	15.84±0.57	a	17.40±1.71	ab	17.97±0.51	ab
	T : AS 1:1	16.32±0.45	a	16.32±0.61	a	16.47±0.38	a	18.52±0.60	ab
	Q: PKK 1:1	16.38±0.26	a	19.24±2.34	ab	21.14±1.06	b	24.06±0.94	b
	T : AS : PKK 1:1:1	16.56±1.02	a	20.13±0.44	ab	23.02±0.01	b	24.33±0.96	b
	BNJ 5%	4.48							
35 HST	T	31.76±0.97	a	32.20±0.51	ab	32.86±0.58	ab	33.04±0.09	ab
	T : AS 1:1	32.52±0.46	ab	33.24±1.21	ab	34.00±1.17	ab	36.72±1.50	b
	Q: PKK 1:1	32.97±0.20	ab	35.08±0.17	ab	36.12±1.08	ab	36.82±0.37	b
	T : AS : PKK 1:1:1	33.01±2.41	ab	37.18±0.43	b	41.16±1.87	bc	42.17±0.15	c

BNJ 5%

4.95

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 1 shows that the combination of planting media treatment with jakaba POC concentration significantly affected the height of eggplant plants at the age of 28–35 HST. The highest average eggplant plant height at the age of 28 HST was 24.33 cm, obtained from the treatment of soil: rice husk charcoal: goat manure 1:1:1 + 60 ml/L POC, while the lowest plant height of 15.73 cm was obtained in the treatment of soil + 15 ml/L POC. At the age of 35 HST, the highest average plant height was 42.17 cm in the treatment of soil: rice husk charcoal: goat manure 1:1:1 + 60 ml/L POC, and was not significantly different from the treatment of soil: rice husk charcoal: goat manure 1:1:1 +

45 ml/L POC. The lowest plant height at 35 HST was 31.76 cm, obtained from the soil + 15 ml/L POC treatment.

The single treatment of planting media had a very significant effect on plant height at 21 and 42 days after planting, and a significant effect at 49 days after planting. Meanwhile, the single treatment of jakaba POC concentration had a significant effect on eggplant plant height at 21 days after planting and a very significant effect at 42 and 49 days after planting (Appendix Table 8-12). The average plant height for each treatment is presented in Table 2.

Table 2. Average Height of Eggplant Plants Due to Single Treatment Differences in Planting Media and Jakaba POC Concentration at Age 7-49 HST

Treatment	Plant Height (cm)							
	7 HST	14 HST	21 HST	42 HST	49 HST			
T	1.83	3.43	6.72±0.05	a	49.25±0.61	a	58.44±1.69	a
T : AS : 1:1	1.84	3.51	6.82±0.05	a	51.32±0.86	ab	59.51±0.93	ab
Q: PKK 1:1	1.90	3.68	7.71±0.03	ab	52.56±1.50	ab	61.1±1.25	ab
T : AS : PKK 1:1:1	1.97	3.73	7.87±0.24	b	54.34±1.49	b	62.18±1.20	b
Bnj 5%	tn.	tn.	0.68		3.45		3.27	
15 ml/L	1.79	3.43	6.83±0.09	a	49.53±0.55	a	57.97±0.96	a
30 ml/L	1.88	3.49	6.88±0.07	a	51.01±1.07	ab	59.10±0.63	ab
45 ml/L	1.93	3.69	7.48±0.15	ab	52.36±1.24	ab	61.98±0.86	b
60 ml/L	1.94	3.72	7.93±0.17	b	54.58±1.60	b	62.19±1.74	b
Bnj 5%	tn.	tn.	0.68		3.45		3.27	

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 2 shows that the analysis of variance for the single treatment of planting media showed a very significant effect on eggplant plant height at 21 and 42 HST, a significant effect at 49 HST, but no significant effect at 7 and 14 HST. At the age of 21 HST, the treatment of planting media soil: rice husk charcoal: goat manure (1:1:1) produced the highest plant height of 7.87 cm, and was not significantly different from the treatment of soil: goat manure (1:1) of 7.71 cm. Meanwhile, the lowest plant height was obtained in the soil planting media with an average of 6.72 cm and was not significantly different from the treatment of soil: rice husk charcoal (1:1) and soil: goat manure (1:1). At the age of 42 HST, the treatment of planting media soil: rice husk charcoal: goat manure (1:1:1) gave the highest result of 54.34 cm, and was not significantly different from the treatment of soil: goat manure (1:1) and soil: rice husk charcoal (1:1). The lowest plant height was obtained in soil planting media of 49.25 cm, and was not significantly different from the treatment of soil: rice husk charcoal (1:1) and soil: goat manure (1:1). At the age of 49 HST, the treatment of soil: rice husk charcoal: goat manure (1:1:1) still produced the highest plant height of 62.18 cm, and was not significantly different from the treatment of soil: goat manure (1:1) and

soil: rice husk charcoal (1:1). Meanwhile, the lowest plant height of 58.44 cm was obtained in soil planting media, which was not significantly different from the treatment of soil: rice husk charcoal (1:1) and soil: goat manure (1:1).

Table 2 shows that the results of the analysis of the variety treatment single POC Jakaba concentration have a significant effect on eggplant plant height at age 21 and a very significant effect at ages 42 and 49 HST, but no significant effect at ages 7 and 14 HST. At age 21 HST, the 60 ml/L concentration treatment produced the highest plant height of 7.93 cm, and was not significantly different from the 45 ml/L treatment. The lowest plant height was observed at 15 ml/L, with an average of 6.83 cm, and was not significantly different from the 30 ml/L and 45 ml/L treatments. At 42 days after planting, the 60 ml/L concentration treatment gave the highest yield of 54.58 cm, and was not significantly different from the 45 ml/L and 30 ml/L treatments. The lowest plant height was observed at a concentration of 15 ml/L (49.53 cm) and was not significantly different from the 30 ml/L and 45 ml/L treatments. At 49 days after planting, the 60 ml/L concentration treatment produced the highest plant height of 62.19 cm, and was not significantly different from the 45 ml/L and 30 ml/L treatments. Meanwhile, the lowest plant

height of 57.97 cm was observed at a concentration of 15 ml/L and was not significantly different from that of the 30 ml/L treatment.

Observation results show that the combination of soil treatment: rice husk charcoal: goat manure (1:1:1) + 60 ml/L Jakaba POC provides the optimal results for plant height parameters. The interaction between the planting medium and Jakaba POC The effect on plant height occurs because these two factors complement each other in providing nutritional needs and supporting plant physiological processes. A growing medium rich in organic matter maintains soil moisture and slowly releases essential nutrients, making them available to plants to support their growth. (Yavitt et al., 2021) Nitrogen increases the rate of photosynthesis and supports the elongation of plant stems. In addition, nitrogen plays a role in protein synthesis, which is essential for cell growth and thus affects plant height (Anas et al., 2020). Besides that, POC Jakaba also contains Pectolytic pectin bacteria, which synthesize carbohydrates and amino acids to produce growth hormones, or Plant Growth Regulators (PGRs), which plants very much need during the vegetative period

(Risman, 2022). The combination of optimal planting media and Jakaba POC provides better microclimate conditions around the roots, increasing nitrogen uptake efficiency and stimulating active cell growth. This results in faster plant growth and taller stems than plants receiving only one treatment. The results of this study indicate that goat manure, when mixed with rice husk charcoal and soil, serves as a planting medium. The addition of additional fertilizer in the form of 60 ml/L POC resulted in higher eggplant plant height, namely 62.18 cm compared to research by Musthafa (2022) who reported an increase in tomato plant height of up to 101.08 cm with a planting medium of 75% soil and 25% rice husk charcoal and a dose of 375 g of goat manure compost per polybag, higher than the control which was only 92.55 cm. Abdillah et al. (2023) found that goat manure increased leaf area and the number of leaves. flower in a significant way, while the Jakaba POC contains hormones and beneficial microorganisms that were found to stimulate vegetative growth of plants, with an optimal concentration of 60 ml/L providing an increase in plant height of 62.18 cm in this study.

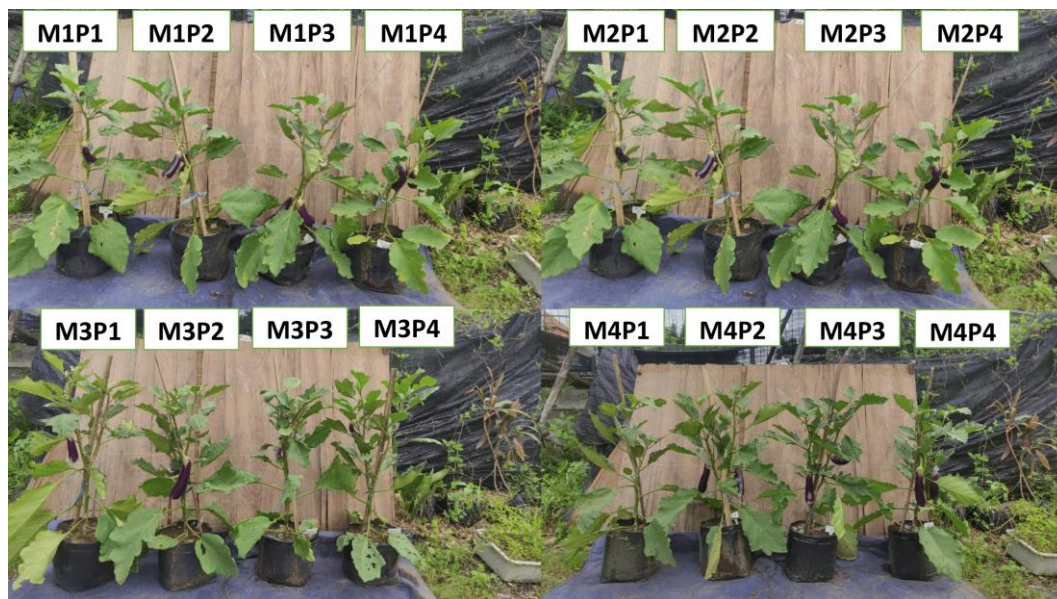


Figure 3. Vegetative Results of Eggplant Plants with Various Treatments. Description: M1 = Soil (Control); M2 = Soil : Rice husk charcoal (1:1); M3 = Soil : Goat manure (1:1); M4 = Soil : Rice husk charcoal : Goat manure (1:1:1). P1 = 15 ml/L; P2 = 30 ml/L; P3 = 45 ml/L; and P4 = 60 ml/L.

3.2. Number of Leaves

The results of the analysis of variance (ANOVA) showed a significant interaction between planting media and Jakaba POC on the number of eggplant plant leaves at 28 and 35 HST. The single treatment of planting media had a very significant effect on the number of plant leaves at 21 HST and 42 HST, and a significant effect at 49 HST. The single treatment of Jakaba POC concentration had a very significant effect on the number of plant leaves at 21 HST and a significant effect at 42 and 49 HST. The average value of the number of eggplant plant leaves due to the

combination of treatments is presented in Table 3.

Table 3 shows that the combination of planting media treatment with jakaba POC concentration significantly affected the number of eggplant plant leaves at the age of 28–35 HST. The highest average number of leaves at the age of 28 HST was 12.78 pieces from the treatment of soil: rice husk charcoal: goat manure (1:1:1) + 60 ml/L POC, and was significantly different from all other treatments. The lowest number of leaves (10.33 pieces) was obtained in the treatment of soil + 15 ml/L POC, and was not significantly different from the treatment of soil: rice husk

charcoal (1:1) + 15 ml/L POC. At the age of 35 HST, the highest average number of leaves was 17.67 pieces in the treatment of soil: rice husk charcoal: goat manure (1:1:1) + 60 ml/L POC, and was significantly different from all other treatments. The lowest number of leaves at the age of 35 HST was 12 pieces obtained from the treatment of soil + 15 ml/L POC.

The single treatment of planting media had a very

significant effect on the number of plant leaves at 21 and 42 HST, and a significant effect at 49 HST. Meanwhile, the single treatment of POC jakaba concentration had a very significant effect on the number of eggplant plant leaves at the age of 21 HST and a significant effect on the number of eggplant plant leaves at the ages of 42 and 49 HST (Appendix Table 15-19). The average number of eggplant plant leaves per treatment is presented in Table 4.

Table 3. Average Number of Eggplant Leaves Due to Combination Treatment of Different Planting Media and Jakaba POC Concentration at 28 and 35 Days After Planting

Age	Planting Media Treatment	Number of Leaves (Sheets)							
		POC concentration (ml/L)							
		15		30		45		60	
28 HST	T	10.33±0.19	a	11.56±0.22	b	11.56±0.29	b	11.67±0.19	b
	T : AS 1:1	10.78±0.22	a	11.56±0.29	b	11.56±0.22	b	11.67±0.00	b
	Q: PKK 1:1	11.56±0.11	b	11.56±0.22	b	11.67±0.19	b	11.67±0.33	b
	T : AS : PKK 1:1:1	11.56±0.11	b	11.67±0.00	b	12.00±0.00	b	12.78±0.22	c
	BNJ 5%	0.96							
35 HST	T	12.00±0.19	a	12.44±0.29	ab	14.00±0.38	ab	14.89±0.22	b
	T : AS 1:1	13.78±0.29	ab	14.22±0.22	b	14.22±0.11	b	14.89±0.29	b
	Q: PKK 1:1	15.00±1.07	b	15.11±0.22	b	15.22±0.68	b	15.22±0.73	b
	T : AS :PKK 1:1:1	15.22±0.11	b	15.33±0.00	b	15.33±0.38	b	17.67±0.33	c
	BNJ 5%	2.04							

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 4. Average Number of Eggplant Leaves Due to Single Treatment of Differences in Planting Media and Jakaba POC Concentration at 7-49 Days After Planting

Treatment	Number of Leaves (Sheets)							
	7 HST	14 HST	21 HST		42 HST		49 HST	
T	2.94	4.72	7.64±0.33	a	19.33±0.12	a	24.14±0.43	a
T : AS : 1:1	2.97	4.97	8.00±0.06	ab	19.50±0.32	a	24.72±0.39	a
Q: PKK 1:1	3.06	5.06	8.22±0.13	b	20.33±0.30	ab	26.14±0.95	b
T : AS : PKK 1:1:1	3.06	5.25	8.64±0.19	b	21.36±0.48	b	27.36±0.93	c
BNJ 5%	tn.	tn.	0.48		1.07		2.72	
15 ml/L	2.92	4.75	7.81±0.24	a	19.44±0.24	a	23.86±0.44	a
30 ml/L	3.00	4.92	7.89±0.25	ab	20.08±0.54	ab	25.22±0.56	b
45 ml/L	3.06	5.11	8.25±0.24	ab	20.17±0.55	ab	26.53±0.96	b
60 ml/L	3.06	5.22	8.56±0.21	b	20.83±0.56	b	26.75±1.00	b
BNJ 5%	tn.	tn.	0.48		1.07		2.72	

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 4 shows that the results of the analysis of variance of single treatment of planting media have a very significant effect on the number of eggplant leaves at the ages of 21 and 42 days after planting, and a significant effect on the number of eggplant leaves at 49 days after planting, but no significant effect at the ages of 7 and 14 days after planting. At the age of 21 days after planting, the highest number of leaves was obtained in the treatment of soil: rice husk charcoal: goat manure (1:1:1) amounting to 8.64 pieces, and was not significantly different from the treatment of soil: goat manure (1:1) and soil: rice husk charcoal (1:1). The lowest number of leaves was obtained in the treatment of soil at 7.64 pieces, and was not

significantly different from the treatment of soil: rice husk charcoal (1:1). At the age of 42 days after planting, the highest number of leaves was obtained in the treatment of soil: rice husk charcoal: goat manure (1:1:1) amounting to 21.36 pieces, and was not significantly different from the treatment of soil: goat manure (1:1). The lowest number of leaves was obtained in the soil treatment of 19.33 pieces, and was not significantly different from the soil: rice husk charcoal (1:1) and soil: goat manure (1:1) treatments. At 49 HST, the highest number of leaves was obtained in the soil: rice husk charcoal: goat manure (1:1:1) treatment of 27.36 pieces, and was significantly different from all treatments. The lowest number of leaves was obtained in the soil

treatment (24.14 pieces) and was not significantly different from the soil: rice husk charcoal (1:1) treatment.

Table 4 also shows the results of the analysis of variance of a single treatment of POC concentration, showing a very significant effect on the number of eggplant plant leaves at the age of 21 HST, and a significant effect on the number of eggplant plant leaves at the ages of 42 and 49 HST, but no significant effect at the ages of 7 and 14 HST. At the age of 21 HST, the highest number of leaves was obtained in the 60 ml/L treatment of 8.56 leaves, and was not significantly different from the 45 ml/L and 30 ml/L treatments. The lowest number of leaves was observed in the 15 ml/L treatment (7.81 leaves) and was not significantly different from the 30 ml/L and 45 ml/L treatments. At the age of 42 HST, the highest number of leaves was obtained in the 60 ml/L treatment of 20.83 leaves, and was not significantly different from the 45 ml/L and 30 ml/L treatments. The lowest number of leaves was observed in the 15 ml/L treatment (19.44 leaves) and was not significantly different from the 30 ml/L and 45 ml/L treatments. At 49 days after planting, the highest number of leaves was observed in the 60 ml/L treatment (26.75 leaves) and was not significantly different from the 45 ml/L and 30 ml/L treatments. The lowest number of leaves was observed in the 15 ml/L treatment (23.86 leaves) and was significantly different from all other treatments.

The observation results showed that the combination of soil treatment: rice husk charcoal: goat manure (1:1:1) + 60 ml/L POC Jakaba gave the most optimal results for the number of leaves parameter. This finding is thought to be due to the content of organic matter and nutrients from goat manure added to the porous structure of rice husk charcoal, plus POC Jakaba, which contains many nutrients and microorganisms that accelerate the process of breaking

down organic matter in the soil, thus creating ideal planting media conditions for root development and nutrient absorption (Rahmad et al., 2025) Jakaba POC can help improve soil structure and increase the activity of soil microorganisms, which play a vital role in nutrient cycling and plant health. Regularly adding Jakaba POC to the base of the media also provides additional nutrients that support the formation of leaf and stem tissue.

Perchlik and Tegeder (2018) stated that the high nitrogen content of goat manure and the presence of micro minerals in Jakaba POC can accelerate plant height. The results of this study showed that goat manure planting media mixed with rice husk charcoal and soil planting media and the addition of additional fertilizer in the form of 60 ml / L POC resulted in higher eggplant plant height, namely 27.36 leaves compared to the study of Haris et al. (2024) who reported that a dose of 20 ml / L POC in mixed media produced the best number of eggplant leaves on average 18.8 leaves, higher than other treatments. Siregar (2024) also showed that goat manure biochar treatment at a dose of 450 grams had a significant effect on the number of tomato plant leaves, increasing to 15-20 leaves at 6 weeks of age.

3.3. Number of Fruits Per Plant

The results of the analysis of variance (ANOVA) on the number of fruits per eggplant plant showed a significant interaction between planting media and Jakaba Organic Fertilizer (POC). Furthermore, there was a highly significant effect between the single treatment of planting media and Jakaba Organic Fertilizer on the number of fruits per eggplant plant. The average number of fruits per eggplant plant resulting from the combination of treatments is presented in Table 5.

Table 5. Average Number of Fruits per Eggplant Plant Due to Combination Treatment of Different Planting Media and Jakaba POC Concentration

Planting Media Treatment	Number of Fruits (Fruits)							
	POC concentration (ml/L)							
	15		30		45		60	
T	2.44±0.22	a	3.89±0.11	ab	4.11±0.29	ab	4.11±0.44	ab
T : AS 1:1	4.44±0.78	b	4.78±0.29	bc	4.78±0.11	bc	4.78±0.29	bc
Q: PKK 1:1	5.78±0.22	bc	5.89±0.89	bc	6.11±0.22	bc	8.33±0.33	c
T : AS : PKK 1:1:1	6.89±0.62	c	7.00±0.00	c	8.33±0.33	c	8.78±0.22	c
BNJ 5%	1.92							

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 5 shows that the combination of planting media treatment with jakaba POC concentration significantly affected the number of fruits per eggplant plant. The highest average number of fruits was 8.78 fruits from the treatment of soil: rice husk charcoal: goat manure (1:1:1) + 60 ml/L POC which was not significantly different from the treatment of soil: goat manure (1:1) + 60 ml/L POC. Meanwhile, the lowest number of fruits was obtained at a

concentration of 15 ml/L, averaging only 2.44 fruits. This finding is thought to be due to the fertile media conditions and the availability of phosphorus (P) and potassium (K), which optimally support the flowering phase, fruit formation, and fruit enlargement. Phosphorus (P) plays a crucial role in photosynthesis, which in turn affects plant organ development, including flower, fruit, and seed formation. Therefore, every plant needs to take in

phosphorus in optimal amounts to support maximum growth and development (Bachtiar et al., 2016). Optimal potassium levels are crucial for increasing water absorption in plants, as K^+ ions play a role. The presence of these ions plays a role in the formation of cell turgor pressure, which regulates stomatal opening and closing. This process supports smooth activity assimilation plants, so that amount assimilates produced increase (Marschner, 2012) The results of this study indicate that goat manure mixed with rice husk charcoal and soil as planting media and the addition of additional fertilizer in the form of 60 ml / L POC resulted in a higher number of eggplants, namely 8.78 fruits where the use of goat manure mixed with rice husk charcoal and soil as planting media and the application of 60 ml / L POC additional fertilizer provided the highest results in plant

height and significantly increased the number of eggplants per plant. This is consistent with the results of research by Haris et al. (2024), which showed that planting media of soil, rice husks, and manure yielded an average of 1.7 eggplants per plant.

3.4. Fruit weight per plant

The results of the analysis of variance (ANOVA) on the total fruit weight per eggplant plant showed that there was no interaction between planting media and Jakaba POC. However, the single treatment of planting media and Jakaba POC showed a very significant effect on the total fruit weight per eggplant plant (Appendix Table 33). The average total fruit weight per eggplant plant for the single treatment is presented in Table 6.

Table 6. Average Total Fruit Weight per Eggplant Plant Due to Single Treatment Differences in Planting Media and Jakaba POC Concentration

Treatment	Fruit Weight per Plant (grams)	
Growing media		
T	379.37±58.56	a
T : AS 1:1	531.96±132.37	b
Q: PKK 1:1	754.49±131.11	c
T : AS : PKK 1:1:1	911.75±235.24	d
BNJ 5%	147.10	
POC Concentration		
15 ml/L	525.48±83.21	a
30 ml/L	617.48±103.51	a
45 ml/L	665.32±75.23	ab
60 ml/L	769.28±43.24	b
BNJ 5%	147.10	

Description: Numbers followed by the same letter at the same treatment and age show no significant difference in the 5% BNJ test; tn = no significant difference; T = Soil; AS = Rice Husk Charcoal; PKK = Goat Manure

Table 6 shows that the results of the analysis of variance of a single treatment of planting media have a very significant effect on the total fruit weight per eggplant plant. The highest total fruit weight per plant was obtained in the soil: rice husk charcoal: goat manure (1:1:1) planting media treatment, with 911.75 grams, and was significantly higher than all other treatments. Meanwhile, the lowest total fruit weight per eggplant plant was obtained in the soil treatment (379.37 g) and was significantly lower than all treatments. The results of this study indicate that goat manure planting media mixed with rice husk charcoal and soil planting media produced a higher eggplant fruit weight, namely 911.75 grams, compared to the study by Abdillah et al. (2023), which provided goat manure planting media alone at 8 WST, with a fruit weight of 121.44 grams. This finding is thought to be due to the role of goat manure and rice husk charcoal as organic materials that can provide macro- and micro-nutrients in the media. This is supported by Ndiwa (2022), who notes that manure, as an organic material, can improve soil structure, increase the soil's ability to bind water, and increase the composition of soil organic material, which is decomposed by soil microorganisms into macro- and micro-nutrients available

for plant growth and development. (Ndiwa, 2022)

The single treatment of jakaba POC concentration also had a very significant effect on the total fruit weight per eggplant plant. The highest total fruit weight per eggplant plant was observed at a POC concentration of 60 ml/L (769.28 grams) and was not significantly different from the 45 ml/L POC concentration treatment (665.32 grams). Meanwhile, the lowest total fruit weight per plant was at 15 ml/L (525.48 grams) and was not significantly different from the 30 ml/L and 45 ml/L POC concentration treatments. Research by Juliansyah (2022) found that the Application of POC at a dose of 8 cc/liter yielded an average of 4.66 fruits per plant, which is higher than the 4 cc/liter dose, which produced 3.82 fruits per plant. Meanwhile, Wasis (2018) reported that applying liquid organic fertilizer at a concentration of 22.5 ml/liter of water increased the number of fruits to an average of 5.2 per plant. These results indicate that applying liquid organic fertilizer at an optimal concentration can significantly increase fruit number, consistent with your research, which found that a POC concentration of 60 ml/L yielded the highest number of fruits and increased overall production yields.

4. Conclusion

A planting medium composed of soil, rice husk charcoal, and goat manure in a 1:1:1 ratio, combined with the application of Jakaba POC at a concentration of 60 ml/L, resulted in the best eggplant growth and yield. This treatment produced the highest plant height, leaf number,

and total fruit weight. It consistently enhanced both the vegetative and generative phases of the plant. Therefore, it is recommended that farmers adopt this combination of planting media, along with Jakaba POC application, to achieve optimal, sustainable eggplant production.

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