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Effect of Coffee Grounds Waste Application on the Growth of Green Grass Jelly Cuttings (*Premna oblongifolia* Merr.)

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ABSTRACT

Background: The quality of green grass jelly cuttings can be improved through fertilization. Coffee grounds waste is one alternative material that can be used as a fertilizer. The organic carbon (C), nitrogen (N), phosphorus (P), and potassium (K) content of coffee grounds waste has been reported to support plant growth in previous studies. However, the appropriate application rate of coffee grounds waste for supporting the growth of green grass jelly cuttings has not yet been clearly established
Aims: This study aimed to determine the effect of coffee grounds waste application rates on the growth of green grass jelly cuttings.
Methods: The study was conducted from March to May 2023 in Talagening, Bobotsari, Purbalingga, Central Java, Indonesia. A randomized complete block design (RCBD) was used with six treatments: NPK fertilizer at 3 g polybag^{-1} and coffee grounds waste at 10, 20, 30, 40, and 50 g polybag^{-1}. Data were analyzed using an F-test, followed by Duncan's Multiple Range Test (DMRT) at the 5% significance level when significant differences were observed.
Results: Coffee grounds waste application promoted the growth of green grass jelly cuttings. The application rate of 40 g polybag^{-1} was effective in increasing the number of shoots, shoot height, number of leaves, leaf length, leaf width, number of roots, and fresh weight of the cuttings.
Conclusion: Coffee grounds waste at 40 g polybag^{-1} was an effective application rate for promoting the growth of green grass jelly cuttings.

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1. Introduction

Green grass jelly (*Premna oblongifolia* Merr.) is a woody shrub native to Indonesia and belongs to the family Lamiaceae and the class Magnoliopsida. The species can be propagated through both vegetative and generative methods. Vegetative propagation is an effective method for producing planting materials because it can shorten the time required for seedling production (Hari, 2021). The success of cutting propagation is influenced by cutting type and environmental conditions, including temperature, humidity, light intensity, and nutrient availability in the growing medium. Root formation is an important indicator of successful cutting propagation and is influenced by the growing medium (Utami, 2020).

The growing medium plays an important role in providing nutrients needed for plant growth and can be improved through fertilizer application (Wibowa *et al*., 2020). Fertilizers are broadly classified into organic and inorganic fertilizers. However, intensive use of inorganic fertilizers may reduce soil organic matter and contribute to environmental pollution, potentially affecting human health and surrounding organisms (Sulaeman *et al*., 2016). The use of organic fertilizers therefore provides an alternative approach to improving growing media while reducing dependence on inorganic fertilizers.

Coffee grounds waste is one organic material with potential for use as an alternative fertilizer. Coffee consumption in Indonesia reached 0.8758 kg capita^{-1} year^{-1} for ground coffee and 0.951 kg capita^{-1} year^{-1} for instant coffee in 2021 (Widaningsih, 2022), generating substantial amounts of coffee grounds waste. Each cup of coffee produces an average of 20 g of coffee grounds (Santosa & Yuwono, 2018). However, this waste remains underutilized and is often treated simply as household waste. Its potential as an organic fertilizer is associated with its nutrient content, which may support plant growth (Agam *et al*., 2020).

The nutrient content of coffee grounds waste further supports its potential as an organic fertilizer. Nitrogen is one of the important nutrients present in coffee grounds and plays a key role in promoting plant growth. Coffee grounds also contain other nutrients, including potassium, phosphorus, magnesium, and calcium, which may contribute to soil nutrient availability (Lee, 2021; Bomfim *et al*., 2022).

Healthy plant growth is important in green grass jelly cultivation, as healthy plants can produce a greater number of harvestable leaves, whereas poor or weak plants may be adversely affected by leaf harvesting (Sofyan *et al*., 2022a). Nutrient availability, particularly nitrogen, is an important factor influencing plant growth and leaf development. Adequate nitrogen supply promotes leaf expansion in green grass jelly cuttings, with higher nitrogen rates resulting in larger leaves, whereas nitrogen deficiency tends to produce smaller leaves (Sulistiyanto & Zubaidah, 2021).

The nitrogen content of coffee grounds waste makes it a potential source of nutrients for plant growth. However, its effect may vary with the application rate. Robusta coffee grounds applied at 50 g were reported to be the most effective rate for promoting plant growth, whereas an application rate of 150 g inhibited growth, as indicated by smaller leaves and a slower growth rate. This response was associated with a decrease in growing medium pH due to the acidic properties of coffee grounds (Kote *et al*., 2026). Coffee grounds also contain minerals and carbohydrates which may contribute to nitrogen release, while their acidic properties can affect soil pH (Kondamudi *et al*., 2018). In addition, residual allelopathic compounds such as caffeine may exert phytotoxic effects and inhibit root elongation and nutrient uptake when applied at excessive rates (Lestari *et al*., 2020). These findings highlight the importance of determining an appropriate application rate when using coffee grounds waste as an organic fertilizer.

The potential of coffee grounds as an organic fertilizer and growing medium amendment has been demonstrated in various crops. Coffee grounds added to the growing medium at concentrations of 5–10% improved the productivity of white oyster mushrooms, as reflected in several yield-related characteristics (Palayukan *et al*., 2025). Coffee grounds-based organic fertilizer also significantly affected the C-organic content, total nitrogen, and pH of the fertilizer and increased the fresh weight of lettuce (Utami *et al*., 2025). In addition, coffee grounds can improve soil quality by increasing water retention and nutrient availability (Mesmar *et al*., 2024). Applications of coffee grounds-based organic fertilizer at 200 g plant^{-1} and 30 g plot^{-1} have also been reported to improve sweet corn production and celery growth and yield, respectively (Analisa *et al*., 2024; Akbar, 2021).

Despite the potential of coffee grounds waste to support plant growth, the appropriate application rate for green grass jelly cuttings has not yet been clearly established. This is particularly relevant because nitrogen availability may promote leaf development in green grass jelly, with leaves being the primary harvested plant part and an important component of its economic value. Therefore, this study aimed to determine the effect of different coffee grounds waste application rates on the growth of green grass jelly cuttings (*Premna oblongifolia* Merr.).

2. Methods

The study was conducted from March to May 2023 in Talagening Village, Bobotsari District, Purbalingga Regency, Central Java, Indonesia. The site is located at approximately 300 m above sea level and is characterized by Andosol soil. The equipment used included a camera, hoe, watering can, weighing scale, raffia string, bamboo stakes, buckets, and writing materials. The materials used were green grass jelly cuttings, coffee grounds waste, rice husk charcoal, and 25 cm × 25 cm polybags.

The experiment was arranged in a Randomized Complete Block Design (RCBD) with six treatments: NPK fertilizer at 3 g/polybag as the control (P0); coffee grounds waste at 10 g/polybag (P1); coffee grounds waste at 20 g/polybag (P2); coffee grounds waste at 30 g/polybag (P3); coffee grounds waste at 40 g/polybag (P4); and coffee grounds waste at 50 g/polybag (P5) (Akbar, 2021; Prasetyo *et al*., 2022).

Each treatment was replicated four times, resulting in 24 experimental units. Each experimental unit consisted of five plants, with one plant per polybag, giving a total of 120 plants. The mathematical model used was as follows:

$$Yij = \mu + \alpha i + \beta j + \varepsilon ij$$

where Y_{ij} is the observed response for the *i*th treatment in the *j*th block, μ is the overall mean, α_i is the effect of the *i*th treatment, β_j is the effect of the *j*th block, and ε_{ij} is the experimental error associated with the *i*th treatment in the *j*th block. The data were analyzed using an F-test, followed by Duncan's Multiple Range Test (DMRT) at the 5% significance level when significant differences were detected.

Coffee grounds waste used in this study was obtained from a coffee shop in Bandung. Before application, the coffee grounds waste was sun-dried until its color turned light brown. The growing medium consisted of soil, rice husk charcoal, and cattle manure mixed at a ratio of 1:1:1 (Chiyaroh *et al*., 2021). The mixture was thoroughly mixed and placed into black polybags measuring 25 cm × 25 cm with a capacity of 3 kg.

Stems selected for cutting propagation were neither too young nor too old, as indicated by a stem color that was not excessively brown, and had a diameter of 0.8–1.2 cm (Rizky *et al.,* 2017). The selected stems were cut into 25 cm sections with four buds each. Before planting, the cuttings were soaked in RootMost® plant growth regulator for 30 minutes to stimulate root formation (Sulistiyanto & Zubaidah, 2021). The cuttings were then planted by inserting 5 cm of the stem into the growing medium.

Fertilization was carried out at the time of planting according to the respective treatments. NPK fertilizer was applied at 3 g/polybag, while coffee grounds waste was applied at 10, 20, 30, 40, and 50 g/polybag. The fertilizer was thoroughly mixed with the growing medium according to each treatment. After planting, the cuttings were maintained by removing weeds, watering, and controlling pests and diseases. Weeds were manually removed starting at 1 week after planting (WAP). Watering was carried out in the morning or afternoon and twice daily during the dry season, depending on weather conditions (Butar, 2020). Pests were removed manually, while diseased plants were uprooted starting at 1 WAP.

The number of shoots, shoot height, number of leaves, leaf length, and leaf width were recorded at two-week intervals until 12 weeks after planting (WAP). Root length, number of roots, and fresh weight were measured at harvest. Fresh weight was determined by weighing the entire plant after harvesting and cleaning (Suminarti & Novrianti, 2017).

3. Results and Discussion

3.1 General Experimental Conditions

Climate data for the study area were obtained from the Meteorology, Climatology, and Geophysical Agency (BMKG) weather station in Tegal, Central Java, Indonesia, as it was the nearest weather station to the experimental site and was located within the same regional area. The recorded temperature during the study period was within the optimal range for green grass jelly growth (Table 1). The optimum temperature for green grass jelly growth ranges from 26 to 31 °C (Maryanti *et al*., 2009). In addition, the recorded sunshine duration from March to May exceeded 6 h day^{-1}, which was considered adequate for green grass jelly growth (Butar, 2020).

Table 1. Summary of climatic data for Talagening from March to May 2023

Month	Temperature (C°)	Rainfall (mm)	Relative humidity (%)	Sunshine duration (h)
March	27.8	181.3	82.26	6.95
April	28.54	123.9	80.26	7.05
May	28.63	56.6	76.87	7.26

Several constraints were encountered during the study, including weed growth and pest infestation. The weeds identified around the green grass jelly plants were false buttonweed (*Spermacoce alata*) (Figure 1a) and chamber bitter (*Phyllanthus urinaria*) (Figure 1b). These weeds were controlled by manual removal.

Pest infestations were also observed during the study, involving cotton aphids (*Aphis gossypii*) (Figure 1c) and black cutworms (*Agrotis ipsilon*) (Figure 1d). The pests were controlled manually. In addition to weed and pest infestations, shading from tall plants in the neighboring field reduced sunlight exposure at the experimental site, which resulted in the death of some green grass jelly plants.

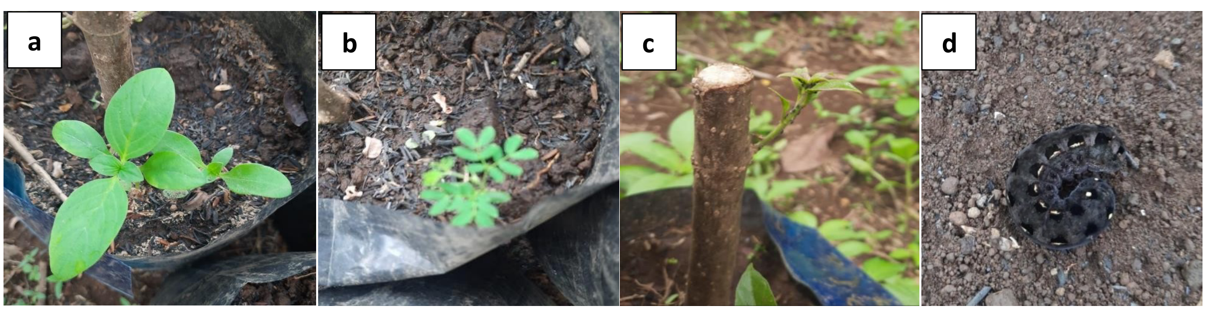

Figure 1. Weeds and pests observed during the study: (a) false buttonweed (*Spermacoce alata*), (b) chamber bitter (*Phyllanthus urinaria*), (c) cotton aphid (*Aphis gossypii*), and (d) black cutworm (*Agrotis ipsilon*).

3.2 Number of Shoots and Shoot Height

Analysis of variance showed that coffee grounds waste application significantly affected the number of shoots at 4, 6, and 8 weeks after planting (WAP), but had no significant effect at 2, 10, and 12 WAP. At 2 WAP, the 10 g/polybag coffee grounds waste treatment produced the highest number of shoots (1.20), although it did not differ significantly from the other treatments based on Duncan's Multiple Range Test (DMRT) at the 5% significance level (Table 2). At 10 and 12 WAP, the highest numbers of shoots were recorded with the 40 g/polybag coffee grounds waste treatment, reaching 3.00 and 2.99 shoots, respectively, although these values did not differ significantly from the other treatments.

Table 2. Effect of coffee grounds waste application on the number of shoots and shoot height of green grass jelly

Observation parameter	Treatment	Observation Time					
		2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
Number of shoots	NPK fertilizer 3 g/polybag	0.85a	1.90b	1.83c	1.60ab	1.50a	1.68a
	Coffee grounds waste 10 g/polybag	1.20a	1.44ab	1.00abc	1.10ab	1.44a	1.75a
	Coffee grounds waste 20 g/polybag	0.85a	1.21ab	1.34bc	1.59ab	1.85a	2.04a
	Coffee grounds waste 30 g/polybag	0.60a	1.00ab	0.42a	0.62a	1.77a	1.71a
	Coffee grounds waste 40 g/polybag	0.75a	1.70b	1.79c	1.98b	3.00a	2.99a
	Coffee grounds waste 50 g/polybag	0.40a	0.65a	0.65ab	0.56a	1.39a	1.46a
Shoot height (cm)	NPK fertilizer 3 g/polybag	0.54a	2.49c	2.77b	3.97b	5.11a	6.49ab
	Coffee grounds waste 10 g/polybag	0.84a	1.84bc	1.68ab	2.69ab	4.13a	6.45ab
	Coffee grounds waste 20 g/polybag	0.79a	1.55abc	1.57ab	1.77ab	3.57a	4.53ab
	Coffee grounds waste 30 g/polybag	0.39a	0.85ab	0.53a	0.63a	1.44a	1.73a
	Coffee grounds waste 40 g/polybag	0.60a	2.63c	3.64b	4.44b	5.40a	9.73b
	Coffee grounds waste 50 g/polybag	0.34a	0.58a	0.58a	0.63a	1.74a	2.59ab

Note: Values followed by the same letter within the same column are not significantly different based on DMRT at the 5% significance level.

The highest number of shoots was recorded in the treatment with coffee grounds waste at 40 g/polybag, reaching 3.00 shoots at 10 WAP (Table 2). This response may be associated with the nutrients and bioactive compounds present in coffee grounds waste. Nitrogen is an essential nutrient for vegetative growth and is involved in the formation of plant growth regulators, including auxin and cytokinin. Cytokinin plays an important role in cell division and shoot formation (Mutryarny & Lidar, 2018). An appropriate balance between auxin and cytokinin promotes shoot development, which is an important indicator of successful cutting propagation. Saefas *et al.* (2017) also reported that adequate cytokinin levels can promote faster shoot formation.

Shoot height was also highest with the application of coffee grounds waste at 40 g/polybag at 4, 6, 8, 10, and 12 WAP, reaching 2.63, 3.64, 4.44, 5.40, and 9.73 cm, respectively (Table 2). At 4, 6, and 8 WAP, the 40 g/polybag treatment differed significantly from the 30 and 50 g/polybag treatments but did not differ significantly from the other treatments. At 10 WAP, the highest shoot height was also observed at 40 g/polybag, although it did not differ significantly from the other treatments. At 12 WAP, the 40 g/polybag treatment differed significantly only from the 30 g/polybag treatment. The greater shoot height observed at this application rate may be related to the availability of nitrogen in coffee grounds waste, which supports vegetative growth.

The effectiveness of coffee grounds fertilizer is also influenced by its processing method. Chemical analysis showed that fermented coffee grounds fertilizer had higher N, P, and K contents than non-fermented coffee grounds fertilizer, resulting in better plant height growth, with an optimal concentration providing the greatest growth response (Teatrawan *et al*., 2022). Similarly, the application of coffee waste-based organic fertilizer significantly affected plant height at 2 and 4 WAP and had a highly significant effect at 6, 8, 10, and 12 WAP (Yusnidar *et al*., 2023). Phosphorus plays an important role in root development, flowering, photosynthesis, respiration, and cell division (Widnyana *et al*., 2017). In addition, organic fertilizer application can increase nitrogen uptake, which is essential for vegetative growth (Ramadhani, 2021). The availability of these nutrients may therefore contribute to shoot growth and height in green grass jelly cuttings.

3.3 Number of Leaves, Leaf Length, and Leaf Width

Analysis of variance showed that coffee grounds waste application significantly affected the number of leaves at 4, 6, 8, 10, and 12 WAP, but not at 2 WAP.

Table 3. Effect of coffee grounds waste application on the number of leaves, leaf length, and leaf width of green grass jelly

Observation parameter	Treatment	Observation Time					
		2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	12 WAP
Number of leaves (leaves)	NPK fertilizer 3 g/polybag	0.50a	5.70b	6.65c	8.35b	12.13b	13.13ab
	Coffee grounds waste 10 g/polybag	1.05a	4.48b	3.95bc	5.48b	9.49b	12.53b
	Coffee grounds waste 20 g/polybag	1.00a	3.54b	4.59bc	6.54b	9.81b	13.34b
	Coffee grounds waste 30 g/polybag	0.60a	1.30a	0.88a	1.29a	2.90a	3.58a
	Coffee grounds waste 40 g/polybag	0.20a	5.43b	5.93c	8.74b	14.83b	19.45b
	Coffee grounds waste 50 g/polybag	0.70a	1.35a	1.70ab	1.10a	4.79ab	6.29ab
Leaf length (cm)	NPK fertilizer 3 g/polybag	0.25a	2.53ab	3.47c	3.46bc	4.45a	4.62ab
	Coffee grounds waste 10 g/polybag	0.77a	2.45ab	2.64abc	2.68bc	4.74a	5.18ab
	Coffee grounds waste 20 g/polybag	0.59a	2.19ab	2.15abc	3.12bc	4.30a	5.39ab
	Coffee grounds waste 30 g/polybag	0.49a	1.38ab	0.92a	1.22ab	1.73a	2.09a
	Coffee grounds waste 40 g/polybag	0.20a	2.80b	3.17bc	3.86c	5.27a	7.44b
	Coffee grounds waste 50 g/polybag	0.39a	0.78a	1.06ab	0.75a	1.55a	2.86a
Leaf width (cm)	NPK fertilizer 3 g/polybag	0.10a	1.12ab	1.70a	1.80b	2.02a	2.13ab
	Coffee grounds waste 10 g/polybag	0.29a	1.08ab	1.15a	1.12ab	1.94a	2.20ab
	Coffee grounds waste 20 g/polybag	0.17a	0.96ab	1.18a	1.25ab	1.84a	2.45ab
	Coffee grounds waste 30 g/polybag	0.29a	0.68ab	0.58a	0.52a	0.87a	1.07a
	Coffee grounds waste 40 g/polybag	0.07a	1.24b	1.44a	1.78b	2.39a	3.26b
	Coffee grounds waste 50 g/polybag	0.14a	0.32a	0.63a	0.36a	0.71a	1.42ab

Note: Values followed by the same letter within the same column are not significantly different based on DMRT at the 5% significance level.

Based on Table 3, coffee grounds waste at 40 g/polybag consistently produced the highest values for the number of leaves, leaf length, and leaf width. The number of leaves at 8 WAP reached 8.74 leaves, which was significantly higher than those obtained with 30 and 50 g/polybag but did not differ significantly from the other treatments. At 10 and 12 WAP, the 40 g/polybag treatment produced 14.83 and 19.45 leaves, respectively. At both observation times, this treatment differed significantly from the 30 g/polybag treatment but not from the other treatments.

Leaf length also showed the highest values with coffee grounds waste at 40 g/polybag, reaching 2.80 cm at 4 WAP and 7.44 cm at 12 WAP. At 4 WAP, the 40 g/polybag treatment differed significantly only from the 50 g/polybag treatment, while at 12 WAP it differed significantly from the 30 and 50 g/polybag treatments. Similarly, the greatest leaf width at 12 WAP was recorded with the 40 g/polybag treatment (3.26 cm), which differed significantly from the 30 g/polybag treatment but not from the other treatments.

The consistently better response at 40 g/polybag indicates that coffee grounds waste may provide nutrients that support leaf development. This response is consistent with Pakpahan *et al*. (2023), who reported that coffee grounds application significantly affected plant height, leaf number, and leaf area, although the optimum dose varied among treatments. Coffee grounds contain caffeine, an alkaloid compound containing nitrogen (N), which may contribute to the nutrient supply available for plant growth (Susianah, 2012). Nitrogen in coffee grounds plays an important role in vegetative growth as a component of amino acids, proteins, nucleic acids, and chlorophyll, thereby supporting photosynthesis and leaf development (Santoso, 2022). Phosphorus and potassium also contribute to plant growth and leaf formation (Sitompul, 2015).

The greater leaf length and width observed at 40 g/polybag may also be related to the availability of nitrogen. Adequate nitrogen promotes chlorophyll formation and photosynthetic activity, which can increase assimilate production and support vegetative growth (Kartika, 2013; Lakitan, 2018). Nitrogen is also involved in the formation of proteins and other compounds required for cell division and tissue development, thereby supporting leaf expansion in green grass jelly cuttings (Sofyan *et al*., 2022b; Sulistiyanto & Zubaidah, 2021; Dhani *et al*., 2014).

3.4 Root length, root number, and fresh weight

The analysis of variance showed that coffee grounds waste significantly affected root length and root number but did not significantly affect fresh weight. At 12 WAP, the longest roots were observed in the NPK 3 g/polybag treatment (6.88 cm), which was significantly longer than those obtained with coffee grounds waste at 30 g/polybag but did not differ significantly from the other treatments (Table 4).

Table 4. Effect of coffee grounds waste application on root length, root number, and fresh weight of green grass jelly cuttings

Treatment	Root length (cm)	Number of roots (roots)	Fresh weight (g)
NPK fertilizer 3 g/polybag	6.88b	7.45ab	42.63a
Coffee grounds waste 10 g/polybag	5.39b	7.71b	34.28a
Coffee grounds waste 20 g/polybag	5.33b	5.98b	30.39a
Coffee grounds waste 30 g/polybag	0.31a	0.19a	34.54a
Coffee grounds waste 40 g/polybag	5.66b	8.50b	46.80a
Coffee grounds waste 50 g/polybag	1.42ab	3.05ab	25.88a

Note: Values followed by the same letter within the same column are not significantly different according to Duncan's Multiple Range Test (DMRT) at the 5% significance level.

The greater root length observed with the NPK treatment may be related to the availability of phosphorus (P), which plays an important role in root development. Adequate P availability can stimulate root growth and improve the development of the root system, thereby increasing the plant's capacity to absorb water and nutrients required for metabolic processes (Mutiah *et al*., 2017). In contrast, the 30 g/polybag treatment produced the shortest roots (0.31 cm), indicating a lower root growth response under this treatment.

In terms of root number, coffee grounds waste at 40 g/polybag produced the highest value (8.50 roots), which was significantly higher than that obtained with the 30 g/polybag treatment (0.19 roots) but did not differ significantly from the other treatments. The relatively high root number at 40 g/polybag suggests that this dose may have provided a more favorable nutrient supply for root development. Phosphorus is particularly important in root formation and development, while nitrogen supports the formation of chlorophyll and other compounds required for plant growth. Faizin *et al.* (2015) reported that phosphorus contributes to root development and supports nitrogen utilization in plant growth.

Coffee grounds waste did not significantly affect fresh weight. Nevertheless, the highest fresh weight was recorded at 40 g/polybag (46.80 g), whereas the lowest value was observed at 50 g/polybag (25.88 g). The relatively high fresh weight at 40 g/polybag may be associated with the greater vegetative growth observed in this treatment, particularly in terms of shoot height and leaf development. A greater number and size of leaves can increase photosynthetic capacity and consequently promote greater photosynthate accumulation, contributing to higher plant fresh weight (Wardhani, 2019).

The nutrients supplied by coffee grounds waste may also contribute to vegetative growth. In addition to N and P, potassium (K) plays an important role in photosynthesis, carbohydrate translocation, water regulation, and protein synthesis (Triadiawarman *et al*., 2022). The combined availability of these nutrients may therefore support both root development and aboveground biomass accumulation. However, because fresh weight did not differ significantly among treatments, the higher numerical value observed at 40 g/polybag should be interpreted as a growth tendency rather than a statistically confirmed treatment effect.

4. Conclusion

The application of coffee grounds waste improved the growth of green grass jelly cuttings. Coffee grounds waste at 40 g/polybag was effective in increasing the number of shoots, shoot height, number of leaves, leaf length, leaf width, number of roots, and fresh weight of green grass jelly cuttings. Meanwhile, NPK fertilizer at 3 g/polybag was effective in increasing the survival rate and root length of green grass jelly cuttings.

5. Authors Note

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

6. Reference

Agam, T., Listya, A., & Muntazori, A. F. (2020). Infografis ampas kopi sebagai pupuk organik penunjang pertumbuhan tanaman. *DESKOMVIS: Jurnal Ilmiah Desain Komunikasi Visual, Seni Rupa dan Media*, *1*(2), 156-172.

Akbar, A. (2021). Pengaruh Ampas Kopi dan Trico-G Terhadap Pertumbuhan Tanaman Seledri (*Apium Graveolens* L.). [Skripsi]. Universitas Islam Riau.

Analisa, W. Annisa, N. F., Syabawaihi (2024). Pemanfaatan limbah ampas kopi dan kelapa berbasis zero waste sebagai pupuk organik terhadap pertumbuhan dan hasil tanaman jagung manis. *Agrifarm: Jurnal Ilmu Pertanian*, *13*(1), 6-9.

Bomfim, A. S. C. D., De Oliveira, D. M., Walling, E., Babin, A., Hersant, G., Vaneeckhaute, C., Dumont. M. J. & Rodrigue, D. (2022). Spent coffee grounds characterization and reuse in composting and soil amendment. *Waste, 1*(1), 2-20.

Butar, R. A. (2020). Pengaruh Pemberian Ampas Teh dan Pupuk Majemuk NPK (15-15-15) Terhadap Pertumbuhan dan Hasil Setek Cincau Hijau *(Premna Oblongifolia Merr*). [Skripsi]. Universitas Musamus.

Chiyroh, L. N. A., Karno, K., & Lukiwati, D. R. (2021). Pengaruh jenis ekstrak kecambah dan pupuk kandang pada komposisi media tanam terhadap pertumbuhan stek murbei (Morus alba). *Journal of Agro Complex*, *5*(1), 32-40.

Dhani, H., Wardati, & Rosmini. (2014). Pengaruh Pupuk Vulmikompos Pada Tanah Inceptisol Terhadap Pertumbuhan dan Hasil Sawi Hijau (*Brassica juncea* L.). *Jurnal Online Mahasiswa Fakultas Pertanian, 1* (1). https://jom.unri.ac.id/index.php/JOMFAPERTA/article/view/2609/2541/

Faizin, N., M. Mardhiansyah., D. Yoza. (2015). Respon Pemberian Beberapa Dosis Pupuk Fosfor Terhadap Pertumbuhan Semai Akasia (Acacia Mangium Willd.) dan Ketersediaan Fosfor di Tanah. *Jurnal Online Mahasiswa Fakultas Pertanian, 2* (2). https://jom.unri.ac.id/index.php/JOMFAPERTA/article/view/8881/8548/

Hari, Z. M. (2021). Pengaruh Berbagai Jenis Pupuk Terhadap Pertumbuhan Tanaman Cincau Hijau (*Cyclea Barbata* Miers). Skripsi. Fakultas Sains dan Teknologi. Universitas Islam Negeri Sunan Ampel.

Kartika. (2013). Tanggapan Tanaman Tomat (Lycopersicum Esculentum Mill.) Terhadap Pemberian Kombinasi Pupuk Organik dan Pupuk Anorganik. *Jurnal Online Universitas Jambi, 2*(3), 122 – 131.

Kondamudi N, Mohapatra SK, Misra M. (2018). Spent coffee grounds as a versatile source of green energy. *Journal of Agricultural and Food Chemistry, 56* (24): 11757–11760.DOI: 10.1021/jf802487s.

Kote, S. G., & Roman, M. F. (2026). Pengaruh Pemberian Ampas Kopi Robusta dengan Dosis Berbeda Terhadap Pertumbuhan Pakcoy (Brassica rapa L.) pada Media Polybag. *Haumeni Journal of Education*, *6*(1), 289-299.

Lakitan, B. (2018). Dasar-Dasar Fisiologis Tumbuhan. Rajawali Pers. Depok.

Lee, S. (2021). Impact of coffee ground on ammonia concentration. *Open Science Journal*, *6*(4), 1 – 9.

Lestari, D., Pramono, E., & Sari, M. (2020). Efek alelopati ampas kopi terhadap pertumbuhan tanaman. Jurnal Biologi dan Pertanian, 12(3), 78–85.

Murhadi, M., Nurdin, S. U., Aprizal, D., & Maryanti, M. (2009). Pengaruh Penambahan Ekstrak Cincau Pohon (*Premna oblongifolia* Merr.) Pada Pakan Terhadap Kandungan Bakteri Asam Laktat Digesta Dan Efek Laksatifnya Pada Tikus Percobaan. *Jurnal Teknologi & Industri Hasil Pertanian*, *14*(2), 129-141.

Mesmar, A. K., Albedwawi, S. T., Alsalami, A. K., Alshemeili, A. R., Abu-Elsaoud, A. M., El-Tarabily, K. A., & Al Raish, S. M. (2024). The Effect of Recycled Spent Coffee Grounds Fertilizer, Vermicompost, and Chemical Fertilizers on the Growth and Soil Quality of Red Radish (Raphanus sativus) in the United Arab Emirates: A Sustainability Perspective. *Foods*, *13*(13), 1997. https://doi.org/10.3390/foods13131997.

Mutiah, F., Daningsih, E., dan Yokhebed. 2017. Pengaruh Perbedaan Konsentrasi Fosfor Teradap Pertumbuhan Brassica Rapa Var. Parachinensis Pada Hidroponik Super Mini. Jurnal Pendidikan dan Pembelajaran Khatulistiwa 6(5): 1 – 10.

Mutryarny, E., & Lidar, S. (2018). Respon tanaman pakcoy (Brassica rapa L) akibat pemberian zat pengatur tumbuh hormonik. *Jurnal Ilmiah Pertanian*, *14*(2), 29-34.

Pakpahan, S., Sulistiyanto, Y., Sinaga, S., Sirenden, R. T., & Amelia, V. (2023). Pengaruh Pemberian Ampas Kopi Terhadap Pertumbuhan dan Hasil tanaman Caisim (Brassica chinensis L.) Pada tanah Spodosol: The Effect Of Giving Coffee Grounds On Growth And Yield Of Caisim Plants (Brassica Chinensis L.) In Spodosol Soil. *AgriPeat*, *24*(2), 7-13.

Palayukan, H. E., Kembong, R., Patasik, R. S., Limbongan, Y. L. L., Pata'dungan, A. M., Tandirerung, W. Y., Kannapadang, S., ... & Karuru, S. S. (2025). Pemanfaatan Ampas Kopi Sebagai Media Tanam dalam Produksi Jamur Tiram Putih (Pleurotus Ostreatus). *Jurnal Informasi, Sains dan Teknologi*, *8*(1), 115-127.

Prasetyo, A., Winarti, S., Zubaidah, S., Sulistiyanto, Y., & Chotimah, H. E. N. C. (2022). Pengaruh Pupuk Organik Cair Dan Pupuk Majemuk Npk Terhadap Pertumbuhan Setek Batang Cincau Hijau: Effect of Liquid Organic Fertilizer and NPK Compound Fertilizer On The Growth of Green Grass Cincau (Premna oblongifolia Merr) Stem Cuttings in Peat Soil. *AgriPeat*, *23*(2), 82-95.

Ramadhani, I., (2021). Pengaruh Pupuk Organic Cair Limbah Ikan dan NPK Mutiara Grower Terhadap Pertumbuhan dan Hasil Tanaman Okra (Abelmoschus Esculentus L.). [Skripsi]. Fakultas Pertanian Universitas Silam Riau. Pekanbaru.

Rizky, M. S., Susanti, R., dan Nazip, K. 2017. Pengaruh Aplikasi Pupuk Hayati Terhadap Pertumbuhan Setek Cincau Hijau (Premna Oblongifolia Merr.) dan Sumbangannya Pada Pembelajaran Biologi SMA. Jurnal Pembelajaran Biologi, Vol 5 (2): 171 – 185.

Saefas, S. A., Rosniawaty, S., & Maxiselly, Y. (2017). Pengaruh konsentrasi zat pengatur tumbuh alami dan sintetik terhadap pertumbuhan tanaman teh (Camellia sinensis (L.) O. Kuntze) klon GMB 7 setelah centering. *Kultivasi*, *16*(2).

Santosa, S. J., & Yuwono, T. (2018). Pemanfaatan limbah ampas kopi untuk tanaman hias dalam pot di Desa sumber Kecamatan Banjarsari Kotamadya Surakarta. *Adi Widya: Jurnal Pengabdian Masyarakat*, *2*(2), 167-173.

Santoso, F. (2022). Pengaruh Berbagai Sumber Zat Pengatur Tumbuh Dan Konsentrasi Pupuk Organik Cair Jeroan Ikan Terhadap Pertumbuhan Stek Jambu Madu *(Syzygium Aqueum)* (Doctoral dissertation, Universitas Islam Riau).

Sitompul, S. M., (2015). *Nutrisi Tanaman: Diagnosis Defisiensi Nutrisi Tanaman*. Malang: Universitas Brawijaya

Sofyan, A., Murdiati, M., & Mulyawan, R. (2022a). Pengaruh perendaman PGPR terhadap pertumbuhan stek batang cincau hijau (Premna serratifolia L.). *Agro Bali: Agricultural Journal*, *5*(2), 256-262.

Sofyan, A., Norgani, A., & Mulyawan, R. (2022b). Pengaruh Perbedaan Dosis PGPR Akar Purun Tikus terhadap Pertumbuhan Stek Batang Cincau Hijau. *Formosa Journal of Science and Technology*, *1*(4), 235 – 246.

Sulistiyanto, Y., & Zubaidah, S. (2021). Pertumbuhan Stek Batang Cincau Hijau (Premna oblongifolia Merr.) Akibat Pemberian Pupuk Organic Cair dan Pupuk NPK pada Tanah Gambut. *AgriPeat, 22*(01), 40-51.

Sulaeman, Yoyok, & Erfandi, D. (2017). Pengaruh kombinasi pupuk organik dan anorganik terhadap sifat kimia tanah, dan hasil tanaman jagung di lahan kering masam. *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian*, *20*(1), 1-12.

Susianah. (2012). *Pemisahan Senyawa Organik.* Bandung: ITB

Teatrawan, I. A., Madyaningrana, K., Ariestanti, C. A., & Prihatmo, G. Pemanfaatan Limbah Ampas Coffea Canephora sebagai Pupuk Pendukung Pertumbuhan Altenanthera Sissoo Utilization of Coffea Canephora Dregs Waste as a Fertilizer to Support Altenanthera Sissoo Growth. *BIOMA, 7*(1), 90-104.

Triadiawarman, D., Aryanto, D., & Krisbiyantoro, J. (2022). Peran unsur hara makro terhadap pertumbuhan dan hasil bawang merah (Allium cepa L.). *Agrifor: Jurnal Ilmu Pertanian dan Kehutanan*, *21*(1), 27-32.

Utami, N., Himawati, S., Handayani, D. P., Surachman, M., Tanjung, A., & Royani, J. I. (2020). Keberhasilan stek tanaman lamtoro varietas tarramba (Leucaena leucocephala cv. Tarramba) karena pengaruh umur fisiologis dan zat pengatur tumbuh. *Pastura*, *10*(1), 42-45.

Utami, A. I., Parmana, D. R., Adhelia, B., Nurrohma, Y. A., & Nurjani, L. D. (2025). Pemanfaatan Limbah Ampas Kopi Sebagai Pupuk Organik Dan Pengaruhnya Terhadap Hasil Tanaman Selada (Lactuca sativa L.). *Jurnal Ilmu dan Teknologi Pertanian*, *1*(02), 63-76.

Wardhani, A. T. (2019). Uji Pertumbuhan dan Produksi Tanaman Sawi Keriting (Brassica Juncea L) Secara Hidroponik Dengan Sumber Nutrisi Yang Berbeda. [Skripsi]. Universitas Medan Area.

Widaningsih, R. (2022). Outlook Komoditas Perkebunan Kopi. Pusat Data dan Sistem Informasi Pertanian Sekretariat Jenderal - Kementerian Pertanian. Jakarta.

Widnyana, I. K., Raka, D. N., Javandira, C., Sukerta, I., & Ari Arjaya, I. B. (2017). *Caru Kearifan Lokal Bali "Tinjauan Manfaat Dalam Kesuburan Dan Biodiversitas Tanah"*. Unmas Press. Bali

Yusnidar, J., Fitria, D., & Fajri, M. (2023). Pengaruh pemberian pupuk organik limbah kulit kopi dan air cucian gabah kopi terhadap pertumbuhan bibit tanaman kopi (Coffea arabica L.). *Biofarm: Jurnal Ilmiah Pertanian*, *19*(2), 395-402.