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Effectiveness of Rice Washing Water Liquid Organic Fertilizer and NPK Fertilizer on Growth and Yield of Eggplant (*Solanum melongena* L.)

Wahda Islamia[1], Aminah[1], St. Subaedah[1]

[1] Agrotechnology Study Program, Faculty of Agriculture and Mine Land Bioremediation, Universitas Muslim Indonesia Jl. Urip Sumoharjo No. km. 5, Panaikang, Panakkukang District, Makassar City, South Sulawesi 90231, Indonesia

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*) Corresponding author:
E-mail: wahdaislamia84@gmail.com

ABSTRACT

This research was conducted at the Green House of the Faculty of Agriculture, Muslim University of Indonesia, Makassar City, South Sulawesi Province, from May to July 2025. The study aimed to determine the effect of the application of LOF rice washing water, NPK fertilizer, and the interaction of both on the growth and yield of eggplant plants. The study used a 2-factor factorial Randomized Block Design with 9 treatment combinations and 3 replications, a total of 27 experimental units, each containing 2 plants (54 polybags). The first factor was the dose of LOF rice washing water (0%, 20% and 30%). The second factor was the dose of NPK (0 g/plant, 1.5 g/plant, and 2 g/plant). The parameters observed included plant height, number of leaves, flowering age, number of fruits, fruit length, fruit diameter, fruit weight, and root volume. The results showed that the application of LOF rice washing water at 30% had a good effect on root growth, while NPK fertilizer at a dose of 2 g/plant had a significant effect on the number of fruits and root volume. The combination of LOF and NPK treatments did not produce a significant interaction on any parameters, although it tended to increase yields in terms of fruit number and root volume. Overall, the best dose was obtained with a combination of 30% rice washing water LOF and 2 g NPK fertilizer per plant, as it produced more optimal root growth and fruit number compared to the other treatments.

INTRODUCTION

Eggplant (*Solanum melongena* L.) originates from India and Indonesia and has since spread to various countries. Eggplant has various regional names and is commonly consumed as a cooked vegetable or raw salad. Eggplant is rich in nutrients, including vitamins A, C, and phosphorus, and contains bioactive compounds with health benefits, including alkaloids with anticancer properties (Permadi *et al.,* 2018; Noviyanti *et al.,* 2021). Purple eggplant production in South Sulawesi increased from 93,384 tons (2018) to 110,084 tons (2019), although it decreased slightly in 2020 to 107,290 tons, indicating high market demand (BPS South Sulawesi, 2020). Fertilization is a key factor influencing productivity. Both chemical and organic fertilization are necessary maintaining soil fertility, with organic fertilizers improving soil properties and increasing pH and organic C content (Muldiana & Rosdiana, 2018; Marewa, 2020).

Rice washing water is a nutrient-rich household waste that can be fermented into liquid organic fertilizer to increase nutrient absorption by plants (Handiyanto *et al.,* 2013; Mujiatul, 2013). NPK fertilizer is also important because it contains N, P, and K, which support vegetative and generative plant growth (Murjiono *et al*., 2023).

Several studies have shown that a combination of liquid organic fertilizer from rice washing water and NPK fertilizer significantly increases the growth and yield of eggplant and tomato plants (Rahmawati, 2020; Fitriani *et al*., 2019; Ayuningtyas *et al*., 2020). Based on this, research this study aims to evaluate the effectiveness of using rice washing water and NPK fertilizer on the growth and yield of eggplant (*Solanum melongena* L.) plants.

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MATERIALS AND METHODS

This research was conducted in the Greenhouse of the Faculty of Agriculture, Muslim University of Indonesia, Makassar City, South Sulawesi Province, from May to July 2025. The materials used in this study included rice washing water, EM4, molasses, NPK Mutiara 16-16-16 fertilizer, eggplant seeds (Laguna F1 variety), chicken manure, soil, clean water, and 40 × 40 cm polybags. The tools used included plastic bottles, buckets, measuring cups, scales, measuring tapes, stationery, cameras, and labels. This study used a two-factor factorial Randomized Block Design (RBD) with three replications, resulting in 27 experimental units. Each experimental unit consisted of two plants, so the total number of plants used was 54 plants grown in polybags. Observation data were statistically analyzed using analysis of variance (ANOVA). If the analysis showed that the calculated F-value was greater than the F-table value at the 0.05 significance level, further analysis was conducted using the Honest Significant Difference (HSD) test.

The rice washing water used in this study was obtained from the first and second washings of white rice. The preparation of liquid organic fertilizer (LOF) began by preparing 10 liters of rice washing water placed in a bucket, followed by the addition of 50 ml of EM4 and 100 ml of molasses. The mixture was stirred until homogeneous and then transferred into a 10-liter jerrycan and tightly closed. Fermentation was carried out for 7 days at room temperature. During the fermentation process, the jerrycan lid was opened once a day to release the gas produced. The LOF was considered ready for use when it had a fresh sour aroma, a yellowish-brown to dark color, and no excessive sediment.

Eggplant seeds were first germinated in sterilized sand media. After two weeks after sowing (WAS), the seedlings were transplanted into polybags containing a mixture of soil and chicken manure in a 1:1 ratio. The planting medium was filled into polybags and left for one week before planting to allow stabilization between the soil and manure. The seedlings used were healthy two-week-old seedlings with 3-4 true leaves, upright stems, and free from pest and disease attacks. Planting was carried out by making a planting hole approximately ±5 cm deep in the center of the growing medium, inserting the seedling, and covering it lightly with soil.

Plant maintenance included daily watering to maintain the moisture of the growing medium and periodic weeding to prevent nutrient competition in the polybags. Pest and disease control was conducted mechanically by removing the affected plant parts. The application of liquid organic fertilizer (LOF) from rice washing water was carried out every 7 days according to the treatment levels: P0 (0%), P1 (20%), and P2 (30%). The LOF was applied by pouring it directly at the base of the plant using a watering can in the afternoon to minimize evaporation. The application was performed four times: at 14 and 21 days after planting (DAP) during the vegetative phase and at 35 and 42 DAP during the generative phase.

NPK fertilizer was applied in two stages, at 14 DAP and 28 DAP, with treatment doses of N0 (0 g plant^{-1}), N1 (1.5 g plant^{-1}), and N2 (2 g plant^{-1}). The fertilizer was applied by broadcasting it in a circular pattern at a distance of 5–10 cm from the plant stem and then lightly covering it with soil. The application was carried out in the morning to increase nutrient uptake efficiency and reduce nutrient loss due to evaporation.

RESULTS AND DISCUSSION

1. Plant Height

The results of observations on eggplant plant height under various combinations of liquid organic fertilizer (LOF) derived from rice washing water and NPK fertilizer treatments are presented in the following figure. The graph illustrates differences in plant height among the treatment combinations.

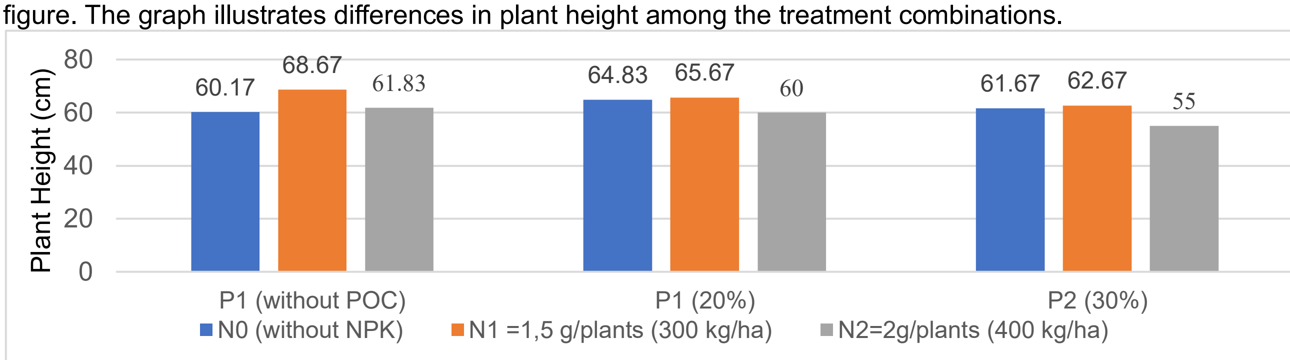

Figure 1. Average height of eggplant plants at 56 days old on LOF, NPK treatment and their interaction

Figure 1 shows that the treatments of liquid organic fertilizer (LOF), NPK fertilizer, and their interaction did not have a significant effect on the plant height of eggplant. Nevertheless, variation in plant height was observed among treatments, ranging from 55 cm to 68.67 cm. The differences in the mean values indicate that plants showed a growth response to the fertilization treatments; however, the magnitude of variation was not large enough to produce statistically significant differences. This condition may occur when environmental factors exert a more dominant influence on plant growth than the fertilization treatments, causing the observed variation to be indistinguishable from experimental error. Previous studies have reported that plant responses to fertilization may become non-significant when environmental conditions such as light intensity, temperature, and humidity act as major limiting factors in plant growth processes (El-Sheshtawy, 2021).

One of the environmental factors presumed to influence plant growth response is light intensity, which plays an essential role in the photosynthesis process. Photosynthesis is the primary process responsible for biomass formation in plants; therefore, limited light availability can restrict the plant's ability to utilize nutrients available in the growing medium. Under suboptimal environmental conditions, such as microclimatic fluctuations or low light intensity, the availability of nutrients from both organic and inorganic fertilizers does not necessarily result in a significant increase in vegetative growth. This indicates that the interaction between nutrient availability and environmental factors strongly determines plant growth responses. Several studies have shown that the effects of fertilization may be reduced or statistically undetectable when environmental conditions do not adequately support plant physiological processes (Noriko et al., 2024).

Other studies have reported that the combination of organic and inorganic fertilizers in horticultural crops, including eggplant, generally improves plant growth and yield when supported by suitable environmental conditions. Organic materials such as compost, vermicompost, manure, and liquid organic fertilizers can improve the physical, chemical, and biological properties of soil, thereby enhance nutrient availability and increase the efficiency of inorganic fertilization (Adjei et al., 2023). In addition, the combined application of organic fertilizers and NPK fertilizers has been reported to enhance vegetative growth and crop productivity in several previous studies (Gnanamani & Vijayalakshmi, 2023). Therefore, the non-significant effect observed in the present study may indicate that environmental factors and growing media conditions had a more dominant influence on plant height than the fertilization treatments applied during the observation period.

2. Number of Leaves

Figure The results of observations on the number of leaves of eggplant plants under various combinations of liquid organic fertilizer (LOF) derived from rice washing water and NPK fertilizer treatments are presented in the following figure. The graph shows differences in the number of leaves among each treatment combination.

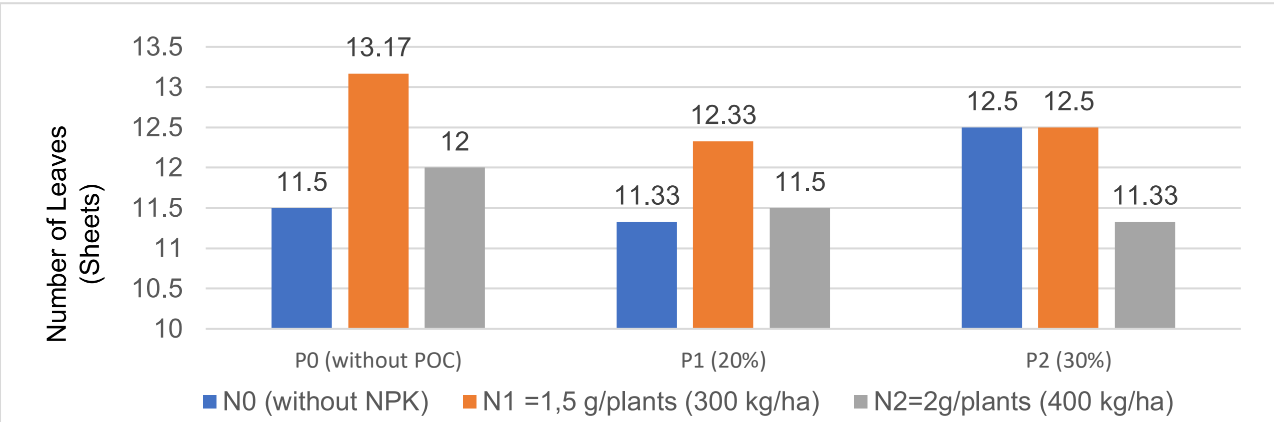

Figure 2. Number of leaves of eggplant plants at 56 days old on LOF, NPK treatment and their interaction

Figure 2 shows the average number of eggplant leaves under different combinations of liquid organic fertilizer (LOF) and NPK fertilizer treatments. The highest average number of leaves was observed in the P0N1 treatment (without LOF and with NPK at 1.5 g plant^{-1} or equivalent to 300 kg ha^{-1}) with 13.17 leaves, while the lowest average was recorded in the P1N0 treatment (LOF 20% without NPK) with 11.33 leaves. However, the analysis of variance indicated that the application of LOF, NPK fertilizer, and their interaction did not significantly affect the number of leaves of eggplant plants. Although numerical differences among treatments were observed, the magnitude of variation was not sufficient to produce statistically significant differences. This pattern is commonly found in crop experiments where environmental variability can suppress the detectable effects of fertilization treatments (Olaokiki & Adejumo, 2021).

One of the environmental factors that may influence the formation of leaves is light intensity. Leaf initiation and development are closely related to the photosynthetic process, which largely depends on the availability of adequate light. When light intensity is limited, photosynthetic activity decreases, resulting in reduced carbohydrate production required for vegetative growth, including leaf formation. Consequently, plants may show limited responses to nutrient supply even when fertilizers are applied. Previous studies have reported that light availability plays a major role in regulating leaf initiation and expansion, and insufficient light can suppress leaf production despite adequate nutrient availability (Mokabel et al., 2022). Under such conditions, environmental factors such as light and microclimate may overshadow the potential effects of fertilization treatments.

In addition, the effectiveness of organic amendments and inorganic fertilizers in influencing vegetative growth traits such as leaf number is often context dependent. Several studies have demonstrated that combinations of organic fertilizers and NPK fertilizers can improve vegetative growth and leaf development when environmental conditions such as light, temperature, and soil moisture are favorable (Plazas et al., 2022). Organic fertilizers may improve soil physical, chemical, and biological properties, thereby enhancing nutrient availability and fertilizer efficiency. However, when environmental factors such as light availability become limiting, the potential benefits of fertilizer application may not be fully expressed, resulting in non-significant statistical differences among treatments (Dalorima et al., 2021).

Although the treatments did not significantly influence leaf number, the observed trend suggests that the moderate NPK treatment without LOF (P0N1) tended to produce a slightly higher number of leaves compared to the treatment receiving LOF without NPK (P1N0). This pattern indicates that mineral nutrient supply from NPK fertilizer may contribute more directly to vegetative growth under the conditions of this study. Nevertheless, the absence of statistical significance suggests that variability within treatments or environmental fluctuations, particularly light conditions, may have masked the potential effects of fertilization. Similar findings have been reported in previous studies where nutrient responses in vegetative traits were influenced by environmental moderators and experimental conditions (Raihing & Vijayalakshmi, 2021).

3. Flowering Age (days)

Figure 3. Observation data on the average number of flowering ages of eggplant plants (Day)

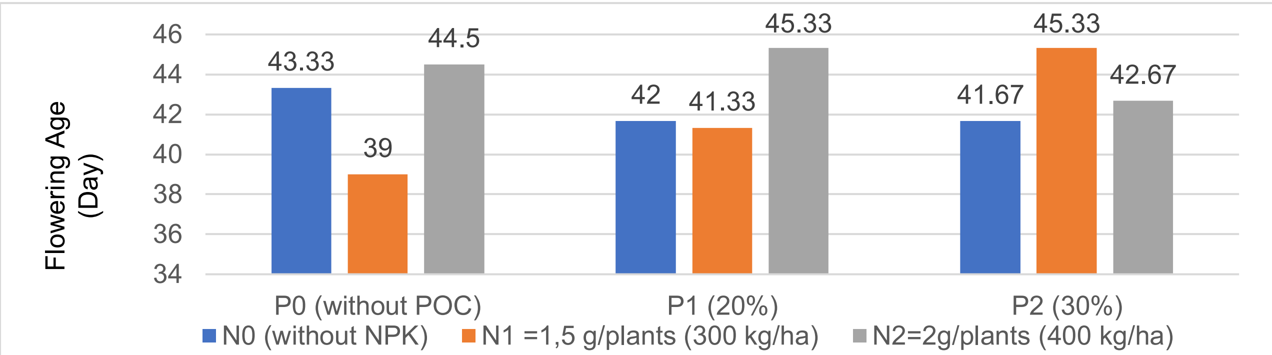

Figure 3. Average flowering age of eggplant plants (days) in LOF, NPK treatments and their interactions

Figure 3 Figure 3 shows the flowering age (50% flowering) of eggplant plants under different combinations of liquid organic fertilizer (LOF) and NPK fertilizer treatments. The fastest flowering time was observed in the P0N1 treatment (without LOF and with NPK at 1.5 g plant^{-1} or equivalent to 300 kg ha^{-1}) with an average of 39.00 days after planting, while the slowest flowering time occurred in the P2N1 treatment (LOF 30% combined with NPK 1.5 g plant^{-1}) with an average of 45.33 days. However, the analysis of variance indicated that the application of LOF, NPK fertilizer, and their interaction did not significantly affect the flowering age of eggplant plants. Although numerical differences among treatments were observed, these differences were not large enough to produce statistically significant effects. Similar findings have been reported in several crop studies where fertilization treatments do not significantly alter phenological traits due to the dominant influence of environmental factors (Mutua et al., 2023).

Flowering time in plants is a complex trait that is largely regulated by genetic factors and environmental cues, particularly light intensity, temperature, and humidity. These environmental signals play a critical role in controlling the transition from vegetative to reproductive growth. When environmental conditions fluctuate or become suboptimal, the effect of fertilization on flowering initiation may become less pronounced. Previous studies have demonstrated that flowering phenology in many crops, including eggplant, is strongly influenced by environmental conditions, while nutrient supply tends to have a secondary role unless nutrient deficiency becomes severe (Dalorima et al., 2021). Under field conditions where light interception, temperature, and humidity vary across time and space, these environmental factors may mask the potential effects of fertilizer treatments on flowering time.

Although the statistical analysis showed no significant effects, the observed trend suggests that the P0N1 treatment tended to induce earlier flowering compared to other treatments. This pattern indicates that the application of moderate NPK fertilizer without additional LOF may have supported a slightly faster transition to the reproductive phase under the experimental conditions. Conversely, the slower flowering observed in the P2N1 treatment may be associated with differences in nutrient release dynamics from organic amendments, which may temporarily favor vegetative growth before the onset of reproductive development. However, because the analysis of variance did not detect significant differences among treatments, these observations should be interpreted as general tendencies rather than definitive treatment effects. Similar trends have been reported in previous studies where organic and inorganic fertilizer combinations influenced flowering and yield components depending on environmental conditions and crop management practices (Rahayu et al., 2021).

4. Number of Fruits

Observation data on the total number of eggplant fruits.

Table 1. Total Number of Eggplant Fruits in Rice Washing Water and NPK Fertilizer Treatments

LOF	NPK (g/plant)			Average
	Without NPK (N0)	NPK 1.5 g (N1)	NPK 2 g (N2)	
Without LOF (P0)	1.00	1.33	1.67	1.33
LOF 20% (P1)	2.33	1.33	1.00	1.56
LOF 30% (P2)	2.33	1.67	2.67	2.22
Average	1.89^{a}	1.44^{b}	1.78^{ab}	
LSD 0.05		0.37		

Note: Numbers followed by different letters are significantly different based on the LSD 0.05 test.

Table 1 presents the results of the LSD test at the 5% significance level for the effect of NPK fertilizer on the total number of eggplant fruits. The results indicate that the highest average number of fruits, 1.89 fruits per plant, was obtained in the N2 treatment (NPK at 2 g plant^{-1}), which was significantly different from the N1 treatment (NPK at 1.5 g plant^{-1}) with an average of 1.44 fruits per plant. The analysis of variance further confirmed that NPK fertilizer had a significant effect on the number of fruits produced, whereas the application of liquid organic fertilizer (LOF) and the interaction between LOF and NPK did not show significant effects. These findings indicate that the availability of macronutrients supplied by NPK fertilizer played an important role in supporting fruit formation in eggplant plants under the conditions of this study.

The increase in fruit number associated with NPK fertilization is consistent with the physiological role of nitrogen, phosphorus, and potassium in plant growth and reproductive development. Nitrogen is essential for vegetative growth through its involvement in the synthesis of amino acids, proteins, and chlorophyll, which enhance photosynthetic capacity and biomass production. Phosphorus plays a crucial role in energy transfer processes and the initiation of flowering, while potassium contributes to carbohydrate translocation, enzyme activation, and fruit development. Adequate supply of these nutrients can therefore enhance flower formation and fruit set, leading to increased fruit production (Rahmaniah, 2023). Similar findings have been reported in previous studies on eggplant and other Solanaceae crops, where NPK fertilization significantly improved yield components, including fruit number and fruit weight.

In contrast, the application of LOF and the interaction between LOF and NPK did not significantly affect fruit number in this study. This suggests that the organic amendment applied may not have contributed substantially to additional nutrient availability beyond that supplied by the inorganic fertilizer. Several studies have reported that the effects of organic fertilizers on fruit production can be highly variable and depend on factors such as the quality of the organic material, nutrient release rate, microbial activity, and environmental conditions (Hasibuan et al., 2024; Jayanti et al., 2022). When environmental conditions or nutrient release dynamics limit the effectiveness of organic amendments, their contribution to yield components such as fruit number may become less apparent.

5. Fruit Length and Fruit Diameter

The interaction between organic and inorganic fertilizers has been widely recognized as an important factor influencing growth and yield components in horticultural crops, including eggplant.

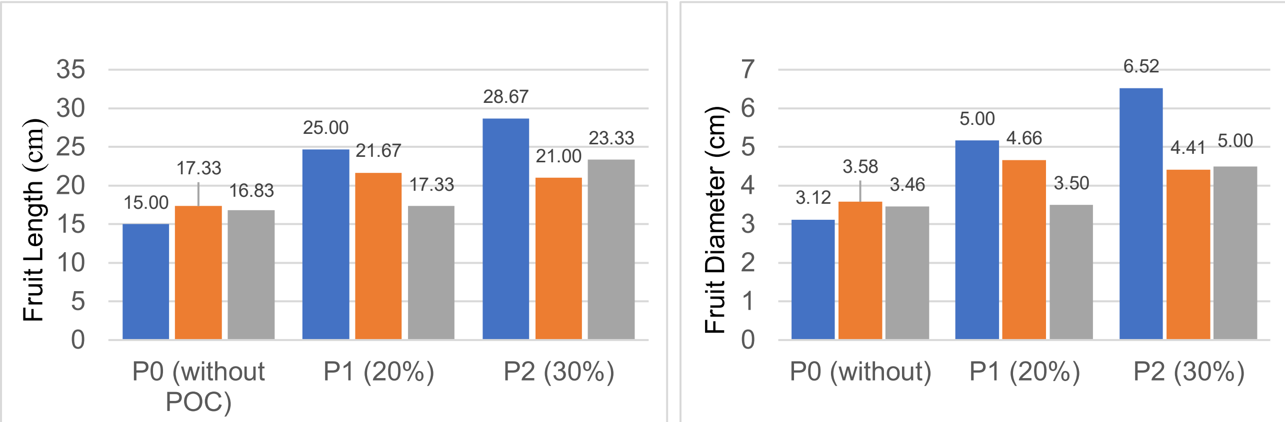

Figure 4. Average Length and Fruit Diameter of Eggplant Fruit (cm) in LOF, NPK and Their Interaction Treatments

In this study, the interaction between LOF and NPK fertilizer on fruit growth characteristics is presented in Figure 4, which shows the average fruit length and fruit diameter under different treatment combinations. The results showed that the highest average fruit length was obtained in the P2N0 treatment (30% LOF without NPK) with a value of 28.67 cm, while the lowest value was observed in the P0N0 treatment (without LOF and without NPK) with an average fruit length of 15 cm. A similar pattern was also observed for fruit diameter, where the highest value was recorded in the P2N0 treatment (6.52 cm) and the lowest diameter occurred in P0N0 (3.12 cm). These tendencies indicate that the application of organic materials such as LOF has the potential to improve fruit development through improvements in soil structure, increased microbial activity, and enhanced nutrient availability for plants (De, 2022; Tiwari et al., 2023).

Although differences among treatments were observed, the results of the analysis of variance (ANOVA) indicated that the application of LOF, NPK fertilizer, and their interaction did not significantly affect fruit length or fruit diameter. This condition may be related to the strong influence of environmental factors on fruit development. Environmental variables such as temperature, humidity, light intensity, and soil water availability are known to play important roles in determining fruit elongation and fruit enlargement in crops belonging to the Solanaceae family. Under environmental conditions with relatively high variability during the growing period, the effects of fertilization treatments often become less statistically detectable, even though differences in observed values may occur in the collected data (Phonia et al., 2022).

In addition to environmental factors, genetic characteristics of the plant may also influence fruit morphology and plant responses to nutrient supply. Differences among varieties often lead to different responses to fertilization and soil amendment treatments due to genotype–environment interactions. Therefore, the variation in fruit length and fruit diameter observed among treatments in this study may also be influenced by the genetic response of the eggplant variety used as well as environmental conditions during the experiment (Muazu & Abubakar, 2021). Although the application of LOF and NPK fertilizers showed certain tendencies in influencing fruit size, fruit development in eggplant is essentially influenced by a complex interaction between nutrient management, environmental conditions, and plant genetic factors.

6. Fruit Weight

The interaction between organic and inorganic fertilizers is an important aspect of integrated nutrient management in horticultural crops because it can influence plant growth as well as yield components.

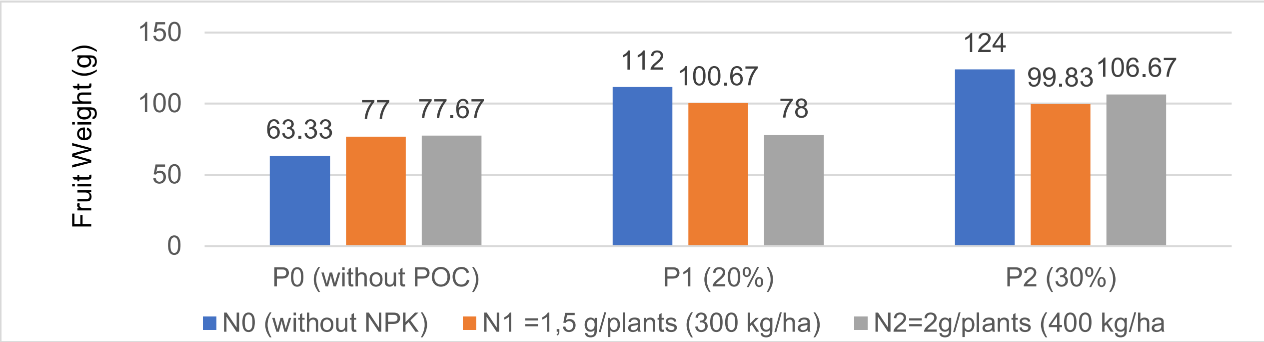

Figure 5. Average Fruit Weight of Eggplant Plants (g) in LOF, NPK Treatments and Their Interactions

Based on the pattern shown in Figure 5, the highest eggplant fruit weight was obtained in treatment P2N0 (30% LOF without NPK) with an average of about 124 g, while the lowest fruit weight was observed in treatment P0N2 (without LOF with full NPK) with an average of about 63.33 g. This pattern indicates that the application of liquid organic fertilizer (LOF) has the potential to increase fruit biomass accumulation even without the use of inorganic fertilizers. Several studies have reported that liquid organic materials derived from plant waste such as fruit peels or plant residues can improve the physical, chemical, and biological properties of the soil, thereby increasing nutrient availability and the efficiency of nutrient uptake by plants (Sulistyono et al., 2023). Therefore, the use of LOF in fertilization systems can support generative growth and fruit development in eggplant.

Although there were differences in values among treatments, the results of the analysis of variance indicated that the application of LOF, NPK fertilizer, and their interaction did not have a significant effect on fruit weight. This condition is consistent with several studies on Solanaceae crops showing that yield responses to combinations of organic and inorganic fertilizers are often influenced by environmental factors, so the treatment effects are not always statistically significant (Jayanti et al., 2022). Environmental factors such as water availability, light intensity, temperature, and humidity play important roles in the photosynthesis process and in the distribution of assimilates to reproductive organs such as fruit. Under less optimal environmental conditions, fruit formation and filling processes may be inhibited even when nutrients are sufficiently available, resulting in relatively similar fruit weights across treatments (Ramesh et al., 2023).

In addition to environmental factors, plant genetic characteristics can also influence responses to fertilization treatments. Differences in eggplant genotypes or varieties are known to cause variations in the ability of plants to utilize nutrients from both organic and inorganic sources. Interactions between plant genotype and environmental conditions can produce different growth and yield responses under the same treatment (Sultana et al., 2021). Therefore, although the treatment of 30% LOF without NPK showed a tendency to produce the highest fruit weight, the development and accumulation of fruit biomass in eggplant are fundamentally influenced by complex interactions among nutrient management, environmental conditions, and plant genetic factors.

7. Volume Wants

The interaction between liquid organic fertilizer (LOF) and inorganic fertilizers such as NPK is an important component of plant nutrient management because it can influence the development of the root system.

Table 2. Average Root Volume of Eggplant Plants in the Treatment of Rice Washing Water and NPK Fertilizer

LOF	NPK (Plant/g)			Average	LSD 0.05
	Without NPK (N0)	NPK 1.5 g (N1)	NPK 2 g (N2)		
Without LOF (P0)	3.83	7.50	7.17	6.17^{b}	
LOF 20% (P1)	6.33	8.33	9.00	7.89^{a}	2.00
LOF 30% (P2)	6.33	7.67	11.00	8.33^{a}	
Average	5.50^{c}	7.83^{b}	9.00^{a}		
LSD 0.05	1.00				

Note: Numbers followed by different letters in the same row and column are significantly different based on the LSD 0.05 test.

Based on the results presented in Table 2, treatment P2 (30% LOF) showed the largest root volume and was significantly different from treatment P0 (without LOF). The increase in root volume under the LOF treatment may be attributed to the organic matter content, which is rich in micronutrients, humic acids, and bioactive compounds such as plant growth hormones and beneficial microorganisms that can stimulate the formation of lateral roots and root hairs. These compounds are known to enhance plant physiological activity, improve soil structure, and increase the plant's ability to absorb water and nutrients from the soil (Narullova, 2021). Therefore, the application of LOF at certain concentrations has the potential to enhance the development of the eggplant root system.

In addition to the effect of LOF, the NPK fertilizer treatment also showed significant differences in root volume, where treatment N2 (2 g NPK) produced the largest root volume and was significantly different from treatments N0 and N1. This is related to the role of macronutrients in NPK fertilizer, particularly phosphorus (P), which plays an important role in cell division, root elongation, and the formation of root branches. The availability of nitrogen and potassium also supports plant tissue growth and physiological balance, thereby increasing overall root biomass (Santos et al., 2023). Therefore, the application of NPK at an appropriate dosage can stimulate the development of a wider and more efficient root system for nutrient absorption from the soil.

However, root growth responses to fertilization treatments are also influenced by environmental factors and plant genetic characteristics. Environmental factors such as water availability, light intensity, temperature, and soil moisture conditions can influence the distribution of photosynthates and the allocation of biomass to the roots. Under certain environmental conditions, plant responses to fertilization treatments may vary due to the interaction between plant genotype and environmental conditions, which affects the plant's ability to utilize available nutrients (Ramesh et al., 2023). Therefore, the development of root volume in eggplant is fundamentally the result of complex interactions among nutrient management, environmental conditions, and plant genetic factors.

CONCLUSIONS

The provision of LOF from rice washing water has an effect on the growth and yield of eggplant plants as shown by the best root volume parameter in the 30% treatment. NPK fertilizer application affected eggplant growth and yield, with the best results at a dose of 2 g/plant. This treatment significantly affected fruit number and root volume, but did not significantly affect plant height, leaf number, fruit length, fruit diameter, or fruit weight. There is no interaction between rice washing water LOF and NPK fertilizer on the growth and yield of eggplant plants.

REFERENCES

Adjei, E., Santo, K. G., Poku, I. A., Alexander, D.-A., & Antwi, A. O. (2023). Garden Egg (*Solanum melongena* L.) Performance under Different Sources of Animal Manure as a Sustainable Alternative Fertilizer for Farmers. Agricultural Sciences, 14(08), 1053–1067. https://doi.org/10.4236/as.2023.148070

Ayuningtyas, V, Koesrihart, & Murdiono, W, E. (2020). Effect of Liquid Organic Fertilizer and NPK Fertilizer on Growth and Yield of Eggplant (*Solanum melongena* L.). *Jurnal Produksi Tanaman*, Vol. 8 No. 11,: 1082-1089.

Dalorima, T., Sakimin, S. Z., & Shah, R. M. (2021). Utilization of organic fertilisers a potential approaches for agronomic crops: A review. Plant Science Today, 8(1), 190–198. https://doi.org/10.14719/pst.2021.8.1.1045

De, L. C. (2022). Natural Farming - A Sustainable Ecological Approach. Research Biotica, 4(1), 05–20. https://doi.org/10.54083/resbio/4.1.2022/05-20

El-Sheshtawy, A.-N. A. (2021). Response of eggplant to irrigation water quality, fertilization and organic extracts under urban agriculture system. Al-Azhar Journal of Agricultural Research, 46(1), 74–90. https://doi.org/10.21608/ajar.2021.218556

Fitriani, S. (2019). Application of Various Doses of NPK Fertilizer and Rice Washing Water Concentration on Tomato Yield. JOM Faperta, 6(1), 1–11.

Gnanamani, K., & Vijayalakshmi, A. (2023). Efficient Utilization of Agro-industrial Waste through Vermicomposting and its Impact on Growth and Yield of Brinjal (*Solanum melongena* L.). Agricultural Science Digest - A Research Journal, (Of). https://doi.org/10.18805/ag.d-5775

Handiyanto, E., Suryono, L., & Wibowo, H. (2013). Potential of rice washing water as a nutrient source for Plant Growth. Prosiding Seminar Nasional Pertanian Organik, Universitas Brawijaya, Malang.

Hasibuan, A. P., Mustamu, N. E., Sepriani, Y., & Rizal, K. (2024). The Effect of Applying Organic Skin and Coconut Dregs Compost on The Growth and Yield of Purple Eggplant Plants Fertilizer of Red Onion (*Solanum melongena* L.). Jurnal Agronomi Tanaman Tropika (Juatika), 6(2). https://doi.org/10.36378/juatika.v6i2.3629

Jayanti, A. S., sulistyono, A., & Utomo Pribadi, D. (2022). The Effect of Paclobutrazol Concentration and Types of Organic Liquid Fertilizer on The Growth and Production of Tomató (*Solanum Lycopersicum* L.). *JURNAL AGRONOMI TANAMAN TROPIKA (JUATIKA)*, *4*(1), 48-60. https://doi.org/10.36378/juatika.v4i1.1394

Marewa, J. B. (2020). Effect of Rice Washing Water on Eggplant. AgroSainT, 11 (2), 92–99.

Mokabel, S., Olama, Z. A., Ali, S. M., & El-Dakak, R. (2022). The Role of Plant Growth Promoting Rhizosphere Microbiome as Alternative Biofertilizer in Boosting *Solanum melongena* L. Adaptation to Salinity Stress. Plants, 11(5), 659. https://doi.org/10.3390/plants11050659

Muazu, A., & Abubakar, A. Y. (2021). Response of Tomato (*Lycopersicum Esculentum*) Varieties To Npk Fertilizer and Green Manure Rates In the Nigerian Agro-Ecological Areas. Journal of Agripreneurship and Sustainable Development, 4(3), 193–205. https://doi.org/10.59331/jasd.v4i3.245

Mujiatul, M. (2013). Increasing N, P, and K Levels in Tofu Waste Liquid Fertilizer with the Addition of Mexican Sunflower (*Thitonia diversivolia*). Skripsi. Universitas Negeri Semarang, Semarang.

Muldiana, S., & Rosdiana, R. (2018). Response of Eggplant (*Solanum Malongena* L.) to Different Intervals of Liquid Organic Fertilizer Application. Prosiding Semnastan, 155-162.

Murjiono, M. A., Supriyo, H., & Ariyanto, S. E. (2023). Response of Eggplant (*Solanum melongena* L.) Growth to the Application of Water Hyacinth (Eichhornia crassipes) Organic Fertilizer and NPK Fertilizer Doses. Muria *Jurnal Agroteknologi* (MJ-Agroteknologi), 2(2), 40-47.

Mutua, C., Gesimba, R. M., & Ogweno, J. O. (2023). Flower abortion of pepino melon (*Solanum muricatum* Ait.) as influenced by NPK fertilizer rates and growing environment. Adv. J. Plant Biol., 4(2), 21–32. https://doi.org/10.31248/ajpb2022.023

Narullova, W. (2021). Aplikasi LOF POMI dan Kompos Tricho Jagung Terhadap Pertumbuhan Kailan (*Brassica oleraceae* L). Agrihumanis Journal of Agriculture and Human Resource Development Studies, 2(2), 109–118. https://doi.org/10.46575/agrihumanis.v2i2.87

Noriko, N., Agustono, R., Wijihastuti, R. S., Novani, E., Choirunnisa, N. I., & Pambudi, A. (2024). Soil Conservation in *Brassica rapa chinensis* L Growth. Jurnal Penelitian Pendidikan Ipa, 10(5), 2621–2631. https://doi.org/10.29303/jppipa.v10i5.6989

Noviyanti, V., Haris, A., & Nontji, M. (2021). Response of Eggplant (*Solanum melongena* L.) Growth and Production to Various Concentrations and Times of Application of Liquid Organic Fertilizer from Nile Tilapia (*Oreochromis niloticus*) Waste. *AGrotekMAS Jurnal Indonesia*: *Jurnal Ilmu Pertanian*, 2(1), 44-53.

Olaokiki, L. T., & Adejumo, S. A. (2021). Growth performance and nutritional quality of selected vegetables in response to organic and inorganic fertilizers under low and high irradiance. Journal of Plant Stress Physiology, 17–27. https://doi.org/10.25081/jpsp.2021.v7.6487

Permadi, A. A., Rusmarini, U. K., & Sastrowiratmo, S. (2018). Effect of Rice Washing Water, Rice Bran Water, and Organic Fertilizer on Eggplant (*Solanum melongena* L.) Growth and Yield. *Jurnal Agromast*, 3(2).

Phonia, L., Bahadur, V., Thomas, T., & Prasad, V. M. (2022). Effect of Organic Manures and Inorganic Fertilizers on Growth, Fruit Yield and Quality of Cherry Tomato (S*olanum lycopersicum* var. *cerasiforme*) c.v. Pusa Cherry Tomato-1 under Naturally Ventilated Polyhouse Condition. International Journal of Plant & Soil Science, 299–309. https://doi.org/10.9734/ijpss/2022/v34i2231380

Plazas, M., González-Orenga, S., Nguyen-Huu, T., Morar, I. M., Fita, A., Boşcaiu, M., Prohens, J., & Vicente, Ó. (2022). Growth and antioxidant responses triggered by water stress in wild relatives of eggplant. Scientia Horticulturae, 293, 110685. https://doi.org/10.1016/j.scienta.2021.110685

Rahayu, S., Setiawan, S., & Kusna, J. (2021). The Effect of Cow State Fertilizer and Mutiara NPK to Plant Growth and Production of Purple Eggplant (*Solanum melongena* L.) on Alluvial Soil in Polybag. International Journal of Multi Discipline Science (Ij-Mds), 4(2), 44. https://doi.org/10.26737/ij-mds.v4i2.2667

Rahmaniah, R. (2023). Test of Phosphate Fertilizer and Dosage of Chicken Manure on Growth Response and Yield of Eggplant (*Solanum melongena* L) Plants. Ziraa Ah Majalah Ilmiah Pertanian, 48(3), 467. https://doi.org/10.31602/zmip.v48i3.11076

Rahmawati. (2020). Effect of Rice Washing Water on Eggplant (*Solanum melongena* L.) Growth and Yield. *Jurnal Agriculture*, 5(2): 45–53.

Raihing, P., & Vijayalakshmi, A. (2021). Effect of Vermicomposted Vegetable and Fruit Wastes on the Vegetative and Yield Parameters of Lablab (Lablab Purpureus (L.)) Sweet. Agricultural Science Digest - A Research Journal, (Of). https://doi.org/10.18805/ag.d-5476

Ramesh, E., Sikder, S., & Vandana, K. S. (2023). Effect of Integrated Nutrient Management for Growth, Yield and Post-harvest Quality of Tomato. International Journal of Environment and Climate Change, 13(5), 1–10. https://doi.org/10.9734/ijecc/2023/v13i51736

Ramesh, E., Sikder, S., & Vandana, K. S. (2023). Effect of Integrated Nutrient Management for Growth, Yield and Post-harvest Quality of Tomato. International Journal of Environment and Climate Change, 13(5), 1–10. https://doi.org/10.9734/ijecc/2023/v13i51736

Santos, A. C. D., Fonseca, J. G., & Ramadhan, D. (2023). The Effect of Vermicompost Fertilizer and Mutiara Npk 16:16:16 on the Growth and Production of Pakcoy Plant (*Brassica Rapa* L.). Journal of Geoscience Engineering Environment and Technology, 8(2), 148–157. https://doi.org/10.25299/jgeet.2023.8.2.14493

Sulistyono, A., Putri, K. A., & S., D. P. (2023). Effect of Liquid Organic Fertilizer Type and Concentration on the Growth and Production of Purple Eggplant (*Solanum melongena* L.). Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering), 12(4), 997. https://doi.org/10.23960/jtep-l.v12i4.997-1009

Sultana, M., Jahiruddin, M., Islam, Md. R., Rahman, M. M., & Abedin, Md. A. (2021). Effects of nutrient enriched municipal solid waste compost on soil fertility, crop yield and nutrient content in brinjal. Eurasian Journal of Soil Science (Ejss), 10(3), 191–198. https://doi.org/10.18393/ejss.880503

Tiwari, N., Roy, T., Chouhan, M., Anju, A., Muniya, A., & Nandeha, N. (2023). A Review of Organic Farming for Sustainable Agriculture in India. International Journal of Plant & Soil Science, 35(22), 421–434. https://doi.org/10.9734/ijpss/2023/v35i224150