Diversitas Journal
ISSN 2525-5215
Volume 9, Special Issue 1 (jan./mar. 2024) p. 0316 – 0331
https://diversitasjournal.com.br/diversitas_journal

Yield Components and Nutritional Analysis of Eggplant *(*Solanum *melongena* L.*)* Under Varying Rates of Vermicast Fertilizer

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A B S T R A C T

This study was conducted in a farmer's field at Balantay, Dimasalang, Masbate, Philippines, to evaluate the performance of different eggplant varieties with different levels of vermicast fertilizers. The different varieties were arranged in the plot while the levels of vermicast applied were set in the sub-plot using a two-factorial design in a Randomized Complete Block Design (RCBD). Growth parameters such as the number of days to flowering and plant height at maturity were evaluated. The fruit yield and other parameters like yield per treatment in kgs, number of marketable fruits, number of non-marketable fruits, yield per hectare basis, and the chemical analysis of the nutritional value of eggplant fruits were also gathered. Based on the result of the study, growth parameters, and yield performance, particularly on the number of days to flowering, plant height in cm at maturity period, yield per treatment in kilograms, number of marketable fruits, number of non-marketable fruits, and yield in tons were significantly affected by the varying levels of vermicast application. However, a non-significant result was observed between different varieties of eggplant. For nutritional analysis, it was found that the application of higher rates of vermicast (10 tons/ha) resulted in a higher calcium, magnesium, and sodium content. In light of these findings, applying vermicast at 10 tons/ha as a substitute for synthetic fertilizer in eggplant production is recommended for a higher fruit yield and better farm profit.

RESUMO

Este estudo foi conduzido no campo de um agricultor em Balantay, Dimasalang, Masbate, Filipinas, para avaliar o desempenho de diferentes variedades de berinjela com diferentes níveis de fertilizantes de vermicast. As diferentes variedades foram dispostas na parcela enquanto os níveis de vermicast aplicados foram definidos na subparcela utilizando um planejamento bifatorial em Blocos Completos Randomizados (RCBD). Parâmetros de crescimento como número de dias para floração e altura da planta na maturidade foram avaliados. Também foram coletados o rendimento de frutos e outros parâmetros como rendimento por tratamento em kg, número de frutos comercializáveis, número de frutos não comercializáveis, rendimento por hectare e a análise química do valor nutricional dos frutos de berinjela. Com base no resultado do estudo, parâmetros de crescimento e desempenho de rendimento, particularmente no número de dias até a floração, altura da planta em cm no período de maturidade, rendimento por tratamento em quilogramas, número de frutos comercializáveis, número de frutos não comercializáveis, e o rendimento em toneladas foram significativamente afetados pelos diferentes níveis de aplicação de vermicast. Porém, foi observado resultado não significativo entre as diferentes variedades de berinjela. Pela análise nutricional, constatou-se que a aplicação de maiores doses de vermicast (10 toneladas/ha) resultou em maiores teores de cálcio, magnésio e sódio. À luz dessas descobertas, recomenda-se a aplicação de vermicast a 10 toneladas/ha como substituto do fertilizante sintético na produção de berinjela para maior produtividade de frutos e melhor lucro agrícola.

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ARTICLE INFORMATION

Article process:
Submitted: 09/02/2024
Approved: 09/03/2024
Published: 15/03/2024

Keywords:
Vermicast, Fertilizer, Rates, Varieties of Eggplant, Yield, Yield Components, Nutritional Analysis

Palavras-chave:
Vermicast, Fertilizante, Taxas, Variedades de Berinjela, Rendimento, Componentes de Rendimento, Análise Nutricional

DOI: 10.48017/dj.v9i1.2952

Introduction

The global demand for vegetables is expected to increase exponentially in the future. Increasing demand may be due to the continuing growth of the population and the rising per capita consumption of vegetables, specifically in developing countries (Spiker et al., 2023). Vegetable crops play a vital role in the food requirements of the growing population as they are the cheapest source of natural foods (Das et al., 2023). Eggplant is one of the most important vegetables in the world and produces fruit of different colors, sizes, and shapes (Niño-Medina et al., 2017). In addition, eggplant is a non-climacteric fruit, which results in a short shelf-life despite being harvested in immature phases of development (Valenzuela et al., 2017). In the Philippines, eggplant is considered one of the leading and profitable vegetable crops grown by farmers (Philippine Statistics Authority, 2023). Eggplant production provides a sustainable source of income, particularly for small, resource-poor farmers (Hautea et al., 2016).

Despite the demand for more food in response to the increasing population, food crop production among the top-producing provinces in the Philippines has declined from 2.6 percent to 1.0 percent (PSA, 2016). This information implies that the production of crops in the country cannot meet the ever-increasing population. Declining soil fertility levels due to soil acidity brought about by excessive application of synthetic fertilizers without soil analysis and fertilizer recommendations decreases crop production (Wen et al., 2022). Currently, crop growers are looking for alternative solutions to address the lower yield output of vegetables. The options include either the application of organic fertilizer to revive the fertility of the soils or the application of synthetic fertilizers at the right amount (Wang et al., 2022).

Vermicomposts are outputs produced from organic wastes through interactions between microorganisms and earthworms. (Ferrari et al., 2021). This organic fertilizer is a valuable source of essential plant nutrients, including nitrogen, phosphorus, potassium, and micro-nutrients. Its slow-release properties ensure a steady supply of nutrients to plants, reducing the need for synthetic fertilizers and minimizing nutrient runoff, which can harm water bodies (Walia et al., 2024). Applying vermicompost as an organic fertilizer helps improve soil's biological, chemical, and physical properties (Enebe et al., 2023). This organic fertilizer helps restore the properties of soil that has been destroyed (Dollison & Dollison, 2023). The application of vermicompost enhances the soil properties and serves as a primary source of high concentrations of N, P, and K (Rehman et al., 2023). Applying vermicast/vermicompost in eggplant production significantly improved vegetable growth, yield, and water use efficiency (Ebrahimi et al., 2021). The inherent characteristics of organic fertilizers are that they can hold more water and nutrients for better crop development (Amouei et al., 2017). According to Abou El et al. (2020), higher rates of vermicast application significantly improved growth performance and increased fruit yield compared to non-application of fertilizer. Likewise,

Akter et al. (2023) mentioned that to obtain a higher fruit yield, the soil must be applied with vermicompost at the required rates. However, field trials are needed in significant agroecosystems on an excellent recommendation.

Eggplant production using vermicast as a source of fertilizer will give faming community additional source of fertilizer or even a good alternative for conventional synthetic fertilizers being used for years. With this organic fertilizer farmers will not only benefit from the lower cost of fertilizer but also enhanced the fertility of the soil and improved its physical properties.

Based on the above-cited situation, the researcher conducted the study to verify the performance and nutritional composition of different eggplant varieties under varying rates of vermicast to add knowledge on producing eggplant using organic fertilizer to reduce the dependency on synthetic fertilizer and improve soil health.

Materials and Methods

Experimental Site

The experimental study was conducted in the farmers field of Barangay Balantas Dimasalang Masbate Philippines. The experiment is limited only in evaluating the yield components and nutritional analysis of eggplant under vermicast fertilizer application.

Pre-planting Operations

Procurement of Seeds.Seeds of eggplant varieties such as Eggplant Long Purple and Batac Long Purple were procured at a certified Agrivet outlet in Masbate City, Philippines. At the same time, Dumaguete Long Purple was bought from Batangas City, Philippines.

Soil Sampling and Analysis. Soil sample in the chosen experimental area was collected using a composite sampling technique. Collected soil samples were analyzed to evaluate the nutrients available at the site. Soil sampling and analysis were conducted before and after the study. The pH value, OM content, Nitrogen, Phosphorus, Potassium, and CEC were analyzed at the Bureau of Soil and Water Management (BSWM), Quezon City, Philippines.

Land Preparation. The experimental site was plowed three times to eliminate the weeds, insect pests, and soil-borne diseases. Plowing was done at a depth of 15 cm, and then the field was harrowed twice to break the clods and level the field.

Procurement of vermicast. Vermicast applied was purchased and procured at the Department of Agriculture, LGU-Dimasalang, Masbate.

Sowing .Seeds of different eggplant varieties were sown individually in plastic cups with one seed per hole of the cups at a depth of 0.5 cm. Sown seeds were covered by a medium (soil and vermicast) and were watered using a dipper with fine droplets.

Application of vermicast. Vermicast was applied two weeks before transplanting. Applications were based on the ratio designated per treatment. Factor B: Level 0 (Control), Level 1 with 5 tons/ha (6 kgs/plot or 250 grams/hill), Level 2 with 10 tons/ha (12 kg/plot or 500 grams/hill), and Level 3 with 15 tons/ha (18 kgs/plot or 750 grams/hill).

Transplanting. Seedlings at 27 days old, which showed 3-4 true leaves, were transplanted in a plot with a planting distance of 60 cm between hills x 60 cm apart between rows. The number of plants that were transplanted per plot is 24. Eight hundred sixty-four eggplant seedlings with levels of vermicast were applied, and 72 seedlings as check plants applied with inorganic fertilizer were transplanted in the whole experimental area.

Water Management. Watering the plants was conducted immediately after transplanting. Applications were done early in the morning and late in the afternoon, depending on soil conditions. However, less or no water was applied during rainy and cloudy days.

Pest Management. The FSB (Fruit and Shoot Borer) is the most damaging insect pest in eggplant. Infested fruits and shoots of eggplant were cut and burned immediately to minimize FSB infestation in other parts of the eggplant. In addition, rice straw was applied to each plot as a mulching material to control weeds. However, weeds that sprouted were pulled out manually using a dull bolo.

Nutrient Management. Fermented Plant Juice (banana suckers) was made to serve as a supplement to the growing plants. It was diluted to the water using a sprinkler in 2 tbsp./liter of water and was applied twice a week. All experimental crops received the same prepared Fermented Plant Juice concentration except the control.

Care and Maintenance. The experimental area was visited daily to ensure its safety and to monitor its growth and development. Cultivation of crops between rows and hills was performed weekly. It was done continuously throughout the study.

Harvesting and **Postharvest handling.** Harvesting of eggplant started from 46-50 days after transplanting, depending on the variety. Fruits that were still tender were harvested immediately, including oversized and damaged fruits. Harvesting was done two times a week until the five harvesting periods were completed. Fruits of eggplant that were harvested were placed in a harvesting bamboo crate separately according to treatment and variety. Harvested fruits were weighed, packed in bamboo crates and plastic bags and delivered to the interested vegetable buyer.

Data Gathered

The following is the data that was collected throughout the study. A total of 8 inner plants as representative samples per treatment per variety served as the data source.

Growth Parameters

a. The height of the plants at maturity in centimeters was measured from the randomly selected plants, and it was measured from the base of the plant or ground level up to the longest leaf. This was gathered at the last harvesting.
b. The days to flowering were observed and counted from transplanting until the eight inner plant samples in each plot produced flowers.

Yield Components

a. The yield per treatment in kilograms of harvested eggplant per plot was weighted and recorded from the first harvest up to the last harvest.
b. The number of marketable fruits harvested that are still tender and have no damage from insect pests per plot were counted and recorded until the last harvesting.
c. The number of non-marketable fruits that are of low quality or damaged fruits were counted and recorded for the five harvesting periods.
d. The yield per hectare in tons was computed based on the yield per treatment in kgs. over area/plot (m2) multiplied by 10,000 m2 divided by 1000.
e. The nutritional content analysis was conducted immediately after first harvesting. Fruit samples per variety per treatment were separately packed and labeled before analysis. Fruit samples were analyzed at the Department of Science and Technology laboratory office in Rawis, Legaspi City.

Experimental Layout

The experimental area was laid out before the study was conducted. This was arranged in a two-factorial of Randomized Complete Block Design. Each block has 12 plots, represented by three eggplant varieties as the dependent variable and four treatments for levels of

vermicast as the independent variable. Treatments were randomly assigned to each block or replications independently and separately. An additional three plots, each representing every variety, were laid out to serve as a check plot, which was applied with inorganic fertilizer.

Statistical Tools

The data gathered in this study was analyzed using Statistical Tool for Agricultural Research (STAR) software version 2.0.1 developed by the International Rice Research Institute (IRRI) following the analysis of variance in Randomized Complete Block Design (RCBD) to determine the effect of treatments. Comparison among means was made using Least Significant Difference (LSD) test.

Results and Discussions

Soil Characteristics of the Experimental Area

The soil characteristics of the experimental area are shown in Table 1. Based on the result of the pre-planting soil analysis, soil pH (8.1) was slightly higher than the critical range. The organic matter content of the soil sample was 2.57%, which was in the normal range based on the critical range of 2-3%. Total N (0.17%) based on the critical range of 0.3 – 0.6 was highly sufficient. Olsen P (2.12 mg/kg) and exchangeable K (0.16 $cmol_c$/kg), on the other hand, were both deficient in their respective critical ranges. However, the CEC of the soil (50.33 $cmol_c$/kg) was far higher than the critical range of 15-30 $cmol_c$/kg.

Table 1.
Soil chemical properties in the experimental area

Soil Properties	Measured Value	Critical Level Range
pH (Potentiometer)	8.1	5.5 – 8-5
Organic Matter (Walkley and Black/Calorimetric, UV-Vis (Calculation, OC X 1.72)	2.57	2-3
Percent N (Kjelhdahl)	0.17	0.3-0.6
Olsen P (mg/kg)	2.12	20-30
Exchangeable K (cmol/kg)	0.61	0.3-0.6
CEC (cmol/kg)	50.33	15-25

** Source: Analytical Service Laboratory, Bureau of Soils and Management.*

Days to Flowering

As shown in Table 2, the data disclosed that the days to flowering of different eggplant varieties differ, ranging from 36.62 to 39.36 days. The shortest number of days in which

eggplant developed flower was exhibited by the Long purple variety, 36.62 days after transplanting, followed by the Dumaguete long purple variety with 37.81 days. In contrast, the Batac long purple variety obtained the most extended number of days to produce flowers, which bloomed after 39.36 days due to its physiological characteristics which was longer than the other eggplant varieties.

Vermicast application influenced the flowering development of the eggplant varieties. Data revealed that application of 15 tons/ha of vermicast to eggplant hasten early flowering at 35.69 days, while an inconsiderable amount of vermicast at a declining rate of 10 tons/ ha produced flower at 37.10 days and 5 tons/ha at 38.67 days slightly longer days to produce flower. Higher amount of vermicast enhanced the availability of nutrients specially potassium that enhance the flower development of the crop (Karthikeyan et al., 2014). However, the untreated plants developed flowers at 40.25 days after transplanting. In addition, the flowering ability of the crop is enhanced when applied with an increasing amount of vermicompost (Awadhpersad et al., 2021).

Table 2.
Average number of days to flowering of eggplant varieties applied with levels of vermicast.

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	37.88	38.63	36.80	36.00	35.05	**36.62**
Batac Long Purple	38.13	40.50	40.54	38.50	37.88	**39.36**
Dumaguete Long purple	38.00	41.63	38.67	36.79	34.13	**37.80**
Mean*	**37.25** ^{ab}	**40.25**^{a}	**38.67**^{ab}	**37.10**^{ab}	**35.69**^{b}	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

Statistical data analysis revealed no significant difference in the number of days to flowering of the different eggplant varieties. However, significant differences were observed in the varying rates of fertilizer application. It was found that control treatment, application of 5 tons/hectare, application of 10 tons/hectare, and application of commercial fertilizer did not differ significantly in terms of the number of days to flowering. However, the application of 15 tons of vermicast fertilizer took a significantly longer number of days to flower compared to treatment without vermicast application, which produced flowers early. In addition, the interaction of the combined effects of these two factors (variety x vermicast) did not indicate a significant difference in the number of days to flower. The result of the study clearly

emphasized that flower development of eggplants was not affected by the type of varieties and varying rates of fertilization applied.

Plant Height at Maturity

Table 3 shows the average plant height of eggplant varieties applied with different levels of vermicast. The average plant height ranged from 56.19 cm, 56.25 cm, and 56.40 cm, respectively.

The result of the study shows that the plant height of the different eggplant varieties increases as the amount of vermicast fertilizer applied increases. The presence of sufficient amount of essential nutrients like nitrogen in vermicast fertilizer enhances the photosynthetic capability of the plant that will be converted by plants for their growth and development (Sabijon & Sudaria, 2018). In contrast, shorter heights were obtained by eggplant crops without additional fertilizer being applied to the soil—similarly, plants applied with commercial fertilizer registered to have a height comparable with untreated eggplant crops. The result of the study contradicts the study of Esmaielpour et al. (2020), who found that the application of higher rates of vermicast reduces plant height of eggplant crops. However, Torun Kayabaşi, E., & Yilmaz, O. (2021) pointed out that the application of vermicast alone will improve the growth performance of vegetables and is comparable with the performance when synthetic fertilizer is used.

Table 3.

Average height of Eggplant varieties applied with varying rates of vermicast

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	53.13	50.92	53.79	58.92	61.13	**56.19^{a}**
Batac Long Purple	52.38	51.75	55.13	58.71	60.00	**56.40^{a}**
Dumaguete Long purple	50.88	52.33	55.88	54.00	62.79	**56.25^{a}**
Mean*	**52.13^{b}**	**51.67^{b}**	**54.93^{ab}**	**57.21^{ab}**	**61.31^{a}**	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

The statistical data analysis further revealed a significant difference in plant height between the amount of vermicast applied and commercial fertilizer application. However, a

non-significant result was observed in the different varieties of eggplant tested. Furthermore, no interaction or influence was observed between eggplant varieties and varying rates of vermicast on the plant height.

Yield per Treatment in Kilograms.

Table 4 shows the average yield per treatment in kilograms of eggplant varieties applied with varying rates of vermicast fertilizer. The average yields of the three tested varieties are not significantly different from each other.

However, a significant difference was observed in the application of different rates of vermicast fertilizer. The result showed that eggplant crops with higher amounts of vermicast fertilizer applied to the soil (15 tons/ha) produced fruit yield comparable to those eggplant crops applied with commercial fertilizer. Eggplant varieties obtained lower yields without fertilizer application, and it was statistically significant among varieties that were applied with vermicast and commercial fertilizer. The readily available nutrients in vermicast and the slow released characteristics make it more advantageous for the eggplant crop to absorbed the nutrients during the stage of high nutrient requirements. In addition, statistical analysis revealed that the two factors tested have no significant effect on the average yield per treatment. The result of the study was supported by the study of Besas et al. (2020), which found that the application of vermicast in increasing amounts will have higher leaf yields of lettuce crops compared to the non-application of fertilizer.

Table 4.

Average yield per treatment in kgs of Eggplant

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	6.14	3.64	4.57	5.00	5.67	**4.72^{a}**
Batac Long Purple	6.03	3.44	4.13	4.80	5.45	**4.46^{a}**
Dumaguete Long purple	6.53	3.33	4.59	5.03	6.00	**4.74^{a}**
Mean*	**6.23^{a}**	**3.47^{d}**	**4.43^{c}**	**4.94^{bc}**	**5.71^{ab}**	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

Number of Marketable Fruits

The average number of marketable fruits of Eggplant varieties applied with different levels of vermicast for five harvesting periods is shown in Table 5. The number of marketable fruits obtained by varieties of eggplant ranged from 46.00, 48.08, and 48.67, respectively. The data revealed that the number of marketable eggplant fruits of the different varieties was not significantly different from each other.

Comparing the marketable fruit yield of eggplant applied with the different levels of vermicast showed that the application of 15 tons/ha and commercial fertilizer application were not significantly different from each other in terms of marketable fruit yield. However, significant results were obtained between 15 tons/ha, 5 tons/ha, and no fertilizer application. The result of the study clearly shows that the application of vermicast at higher rates resulted in a higher number of marketable fruits developed in all eggplant varieties tested, and it is statistically comparable with the result of the commercial fertilizer as a standard fertilizer used in conventional vegetable farming.

Table 5

Average number of marketable fruits of Eggplant varieties applied with different rates of vermicast and commercial fertilizers

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	67.00	35.00	47.33	53.67	56.33	**48.08^{a}**
Batac Long Purple	64.00	34.00	42.33	49.00	58.67	**46.00^{a}**
Dumaguete Long purple	74.00	34.00	43.67	50.67	66.33	**48.67^{a}**
Mean*	**68.00^{a}**	**34.33^{d}**	**44.44^{cd}**	**51.11^{bc}**	**60.44^{ab}**	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

Number of Non-marketable Fruits

Results of the study showed that treatment means obtained by eggplant varieties ranged from 7.75 to 11.67. The different varieties of eggplant used as experimental crops show no significant difference in non-marketable yield produced per treatment. However, the Batac long purple variety obtained the lowest number of non-marketable fruit yields. In contrast, eggplant long purple and Dumaguete long purple obtained the highest non-marketable fruit yields among the three varieties.

The varying rates of vermicast showed a significant difference in the number of non-marketable fruits produced. The data showed that the application of 15 tons/hectare of vermicast obtained the lowest number of non-marketable yields compared to all tested levels of vermicast and control treatment or no fertilizer application. Likewise, commercial fertilizer application to the different eggplant varieties resulted in more non-marketable fruit yields, statistically higher among the fertilizer treatments.

Furthermore, no interaction was observed between different eggplant varieties and varying rates of vermicast fertilizer to the nonmarketable fruit yield of eggplant. The different rates of vermicast have no significant effect on the nonmarketable yield of the different varieties of eggplant.

Table 6.

The average number of non-marketable fruits of Eggplant varieties applied with levels of vermicast

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	18.00	8.33	11.67	13.00	13.67	**11.67^{a}**
Batac Long Purple	17.00	6.33	8.00	9.00	11.67	**8.75^{b}**
Dumaguete Long purple	19.00	8.33	10.33	12.33	16.33	**11.83^{a}**
Mean*	**18.00^{a}**	**7.66^{c}**	**10.00^{b}**	**11.44^{b}**	**13.89^{a}**	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

Yield per Hectare in Tons

Yield per hectare in tons of the different eggplant varieties applied with varying levels of vermicast and commercial fertilizer is presented in Table 7. It has been recorded that yield in tons by different varieties obtained similar yields per hectare in tons. Yield ranged from 3.72 to 3.95 tons/ha. Batac long purple was noted to have 3.72 tons, followed by eggplant long purple, which obtained 3.93 tons, and Dumaguete long purple with 3.95 tons/ha, respectively.

The application of different levels of vermicast influenced the yield per ha in tons of eggplant varieties. Eggplant varieties applied with 15 tons/ha yielded 4.75 tons. It has been observed that the produced yield of eggplant varieties declines as the amount of applied vermicast decreases. The untreated plant obtained the lowest yield, with 2.89 tons/ha.

Data analysis revealed no significant differences in the average yield per ha in tons in all the tested eggplant varieties. Varieties respond similarly in terms of yield per ha in tons. In addition, significant differences were obtained by applying varying rates of vermicast over those untreated plants. Results revealed that vermicast applied with a rate of 15 tons/ha over 10 tons/ha were not significantly different among each other so as with 10 tons/ha over 5 tons/ha but 15 tons/ha, 10 tons/ha and 5 tons/ha recorded to have significant results as compared to the untreated plants. However, a non-significant interaction of variety and varying rates of vermicast fertilizer was observed. The result of the study was supported by the study of Pattugalan (2023), who found that eggplant crop production applied with vermicompost will produce more fruit yield than other organic fertilizers. The higher the rates of vermicast applied, the more the crop produces a higher yield (Najar et al., 2015).

Table 7
Average yield per ha in tons of Eggplant varieties applied with levels of vermicast.

Eggplant Varieties	Commercial Fertilizer	Vermicast levels (tons/ha)				Mean*
		0	5	10	15	
Eggplant Long Purple	5.12	3.03	3.80	4.17	4.72	**3.93^{a}**
Batac Long Purple	5.03	2.87	3.45	4.00	4.54	**3.72^{a}**
Dumaguete Long purple	5.44	2.78	3.83	4.19	5.00	**3.95^{a}**
Mean*	**5.20^{a}**	**2.89^{d}**	**3.69^{c}**	**4.12^{bc}**	**4.75^{ab}**	

Source: The authors (2024). **-Means followed with the same letter/superscript were not significantly different from each other.*

Nutritional Analysis of Fresh Eggplant Fruit

The nutritional composition of fresh eggplant fruit with varying rates of vermicast and commercial fertilizer is presented in Table 8. The analysis using the Kjeldahl method shows that the protein content of the three-eggplant fruit is higher than the standard eggplant protein content based on the result of the study conducted by Rodriguez-Jimenez et al. (2018) and the USDA database. The protein content of eggplant fruit with the lowest vermicast application got the highest protein content among the three treatments. The presence of available nutrients, especially nitrogen from the vermicast and commercial fertilizer, enhances the protein content of the crop (Sharma et al., 2020). For nutrient content results, eggplant fruit with the highest vermicast application had the highest magnesium (19 mg/100g) and calcium (41mg/100g) content compared to eggplant fruit with the lowest vermicast and commercial fertilizer

application. However, eggplant fruit with the highest vermicast and commercial fertilizer application contained a similar sodium content (7mg/100g). The result of the analysis signifies that higher rates of vermicast application can enhance the nutritional composition of the eggplant fruits harvested.

Table 8

Nutritional composition of fresh eggplant fruit applied with varying rates of vermicast and commercial fertilizer

Nutritional Content Parameter	Analysis Result			Standard Nutritional Content of Eggplant Fruit (Rodriguez-Jimenez et al., 2018 & Sharma et al., 2020)
	Eggplant fruit with the Highest Vermicast Application (15 tons/ha)	Eggplant fruit with the Highest Vermicast Application (5 tons/ha	Eggplant fruit with Commercial Fertilizer	
Protein (%)	1.02	1.11	1.04	0.98%
Magnesium (mg/100g)	19	19	18	15.74
Calcium (mg/100g)	41	22	32	32.80
Sodium (mg/100g)	7	4	7	5.76

** Source: Analytical Service Laboratory, Department of Science and Technology*

Conclusion

Based on the preceding results, the researchers concluded that the application of different levels of vermicast has positive effects on the production performance of Eggplant varieties as to its number of days to flowering, height in cm (last harvest), yield per treatment in kilograms., number of marketable fruits, number of non-marketable fruits as well as yield per hectare in tons. However, the different varieties of eggplant showed no significant differences in all the yield components tested. Nutritional analysis of eggplant fruits applied with higher rates of vermicast resulted in a higher magnesium, calcium, and sodium content than other eggplant fruits. Likewise, the two factors tested (variety x vermicast) for interaction resulted in a non-significant result. Thus, different eggplant varieties can perform better in growth and yield when applied with vermicast as an organic fertilizer.

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