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Different Rates of Vermi Cast Application on Eggplant (*Solanum melongena*) Supplemented with Fermented Golden Apple Snail (*Pomacea canaliculata*)

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ABSTRACT

This study was conducted in the ASIST Experimental Area from July to December 2018 to determine Vermicast's different rates supplemented with fermented golden kuhol. The experimental area measured 146.25 m2, was divided into 15 plots. Each plot measured 1 x 3. Indigenous pesticide and organic fertilizer were used in this study. The different treatments were: T0 – farmers practice, T1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter, T2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter, T3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter and T4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter. Treatments applied with Vermicast, and fermented golden kuhol were highly significantly different in the marketable fruits of eggplant 10 tons Vermi cast + 3 application of fermented golden kuhol, with a ratio of 10ml/liter, had the greatest number of marketable fruits of eggplant. It was also noted

that the eggplants in the different treatments are significantly different in their weight (kg), height (cm) and length of fruits (cm). Eggplant is recommended in other lowland areas on its excellent yield attributed by its weight, height, length, and marketable fruits of eggplant. Additional organic fertilizer and other mixture of fermented golden kuhol may also be tested to come up with a better yield of eggplant.

KEYWORDS

Fermented Golden Kuhol (Golden Apple Snail), Vermicast, Eggplant, Philippines

INTRODUCTION

Eggplant (long purple), scientifically known as *Solanum melongena*, is one of the most profitable vegetable crops in our country, particularly in our locality, Abra. Eggplant is a short-lived perennial herb, 0.5-1.0 meter in height, and branching inhabit. The stems are woody, especially at the base, with hair, sometimes with a violet tinge. The leaves are simple, alternate, single or in pair.

It bears a flower in solitary or in 2-5 flowered cymes; it is thickening as fruits develop. The fruits are large, have a two locator variable in size and shape from 3-6 centimeters in diameter, 5-15 centimeters in long, shiny and purple, black, white or yellow (vegetables in the tropics by H. D. Tindall 1982).

The fruits are used as a common table dish prepared with eggs of chicken, beef, pork, and other vegetables as stuffing. The fruits are the basic ingredient in cooking "pinakbet" a popular vegetable menu of the Ilocano. Eggplant is also used as traditional medicine.

Maghfoer, Soelistyono, & Herlina (2015) described that eggplant could also be utilized as a medicine to reduce cholesterol in the blood, and it is suitable as a diet to regulate hypertension. Owing to the eggplant's high nutrient content, it is presumed that the demand of eggplant will increase so that the production should be increased (El-Goud & Amal, 2020).

Golden kuhol is one of the pests attacking rice plants. Since this is a pest, it must be controlled. The study tries to find valuable use of golden kuhol by fermenting it and using it as foliar fertilizer to eggplants.

Fermented Golden Kuhol is important to the growth and yield of eggplants. Golden kuhol, when fermented, can be used as a fertilizer for eggplant production

according to Calibuso (2010), and the addition of 8 tablespoons fermented kuhol/liter produced the highest yield of eggplants.

OBJECTIVES OF THE STUDY

The study aimed to determine the different rates of Vermicast application on eggplant supplemented with fermented golden kuhol.

MATERIALS AND METHODS

Materials

Carabao, plow, harrow, long tape measure, eggplant seeds, bamboo stick, tabas or bolo, fermented golden kuhol, water, sprayer, weighing instrument, plastic sacks.

Procedure

Preparation of Fermented Golden Kuhol (Golden Apple Snail)

Golden kuhol was collected in the field, and the shell was removed. The flesh of golden kuhol was chopped into small pieces and mixed with molasses and water with a mixture ratio of 1:1:1. The mixture was covered with bond paper. One month fermentation was done and ready for use in the study.

Procurement of Seeds. Seeds of eggplants (long purple variety) were purchased from Snook Commercial Trading, Bangued, Abra.

Seedbed Preparation and Sowing. A mixture of the soil media is sand, carbonated rice hull, and garden soil mixed and sterilized by pouring boiled water a day before sowing the seeds to kill the micro-organism present in the soil and avoid damping-off. The seeds were sown in the prepared seedbed by making rows to set the seeds and covered with fine soil.

Preparation. Areas of 146.25 square meters were cleaned by cutting the grasses for easier plowing. The area was plowed twice and harrowing it to minimize the growth of weeds.

Lay-outing. After preparing the land, lay-outing the treatment was done by following the layout of the experiment treatments T_0, T_1, T_2, T_3 and T_4. Tags and bamboo sticks were prepared to use as markers for the layout.

Furrowing. Furrows were constructed with a distance of 0.75 meters and 50 cm between hills.

Application of Fermented Golden Kuhol. Fermented golden kuhol was applied to the plants two weeks after transplanting.

Transplanting. Transplanting was done late in the afternoon to avoid fast transpiration, stress, and wilting of seedlings. The seedlings for transplanting were 30 days old.

Watering. Watering the newly planted seedlings were done first after transplanting for higher survival

Cultivation. A month after transplanting, cultivation was done to make the soil porous and to allow better aeration. Spraying Botanical insecticide (hot pepper) was sprayed at the rate of 20 ml per liter when the plants begin to bear flowers to control borers that attack it.

Harvesting. The fruits were harvested by picking them from the mother plants upon reaching the right age for harvesting.

Weighing. The harvested fruits were weighed after every harvest and yield per plot was recorded.

Marketing. Harvested fruits after the data collection were sold to the consumers.

Research Design

The statistical research design used in this study was a Randomized Complete Block Design (RCBD). It consists of three (3) blocks with five (5) treatments. The treatments were:

T_0 – Farmers Practice

T_1 – 5 tons Vermi Cast + 3 application of Fermented Kuhol with a ratio of 10 ml/liter

T_2 – 10 ton Vermi Cast + 3 application of Fermented Kuhol with a ratio of 10 ml/liter

T_3 – 15 ton Vermi Cast + 3 application of Fermented Kuhol with a ratio of 10 ml/liter

T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10 ml/liter

Data Gathered

Initial Height – the height of ten sample plants per plot was measured one week after transplanting by using a meter stick.

Weekly Growth Increment –weekly height of ten samples plants was measured until the plants start to bear flowers.

Number of Days to Flower – was done by counting one week after transplanting to the time they bear flowers.

Length of Fruits – ten samples of fruits were measured upon harvesting using a foot rule.

Diameter of Fruits – ten samples of fruits were measured upon harvesting using a vernier caliper.

Number of insects – the number of insects was counted every two weeks.

Number of Non-marketable and Marketable Fruits –the fruits with damage, especially those attacked by insects, were considered non-marketable fruits. Those without damage were classified as marketable fruits, which were counted.

Yield per Treatment –the harvested fruits weight were recorded per harvest to determine the yield per treatment.

Cost and Return Analysis - all the expenses and sales were recorded to determine the project's income. The data gathered were statistically analyzed using the Analysis of Variance to determine the level of significance. LSD was used to know the significance between treatment means.

RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the gathered data.

Table 1. Initial height of the eggplant per treatment (cm)

Treatment	Mean
T_0 – Farmers Practice	20.32[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	30.49[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	32.93[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	33.49[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	30.16[b]

*Means with the same letter are not significant at 5% LSD

Table 1 shows the initial height of eggplant for each treatment. The different treatments showed significant differences in the initial height of eggplant based on the mean of the different treatments. This shows that the different content of Vermi Cast and application fermented golden kuhol has a significant effect on the growth of the eggplant, particularly in the initial height. This implies that

the Vermicast and application of fermented golden kuhol influence the growth of eggplant.

Table 2. Final height of the eggplant per treatment (cm)

Treatment	Mean
T_0 – Farmers Practice	34.63[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	51.79[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	56.55[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	55.60[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	52.60[b]

*Means with the same letter are not significant at 5% LSD

Table 2 shows the eggplant's final height with the different percent of the application of Vermicast supplemented with fermented golden kuhol. Vermi cast and application of fermented golden kuhol showed significant differences on the final height of the eggplant. T2 registered the tallest height with an average of 56.55. Which indicates that this is the prescribed amount of Vermicast and application fermented golden kuhol in the growth of eggplant?

Table 3. Diameter of the eggplant per treatment (cm)

Treatment	Mean
T_0 – Farmers Practice	2.897[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	3.510[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	3.613[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	3.553[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	3.553[b]

*Means with the same letter are not significant at 5% LSD

Table 3 shows the average mean per treatment on the diameter of eggplant fruit. The different mixture of the Vermi Cast and application of fermented

golden kuhol showed no significant differences between the treatments. This indicates that Vermicast and fermented golden kuhol do not affect when it comes to the diameter of the fruit produced. The addition of fermented golden kuhol did not increase the fruit's diameter, which indicates that Vermi cast alone could be used in eggplant production.

Table 4. Length of the eggplant per treatment (cm)

Treatment	**Mean**
T_0 – Farmers Practice	15.03[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	16.66[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	16.57[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	16.67[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	16.94[b]

*Means with the same letter are not significant at 5% LSD

Table 4 shows the length of eggplant fruit per treatment on the different amounts of Vermicast supplemented with golden kuhol. The length of fruits showed significant differences among the five treatments, with T4 registered as the highest mean value of 16.94. This indicates that the highest amount of Vermicast supplemented with golden kuhol produced a longer fruit of an eggplant.

Table 5. Number of damage of eggplant per treatment

Treatment	**Mean**
T_0 – Farmers Practice	20.00[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	106.00[a]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	71.00[a]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	97.00[a]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	61.00[a]

*Means with the same letter are not significant at 5% LSD

Table 5 shows the number of damage to eggplant in each of the different treatments. The number of damaged fruits showed no significant differences among the treatment means. This implies that Vermicast and fermented kuhol do not influence the number of damage to eggplant fruits.

Table 6. Number of fruits of eggplant per treatment

Treatment	Mean
T_0 – Farmers Practice	10.00[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	19.00[ab]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	35.00[c]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	23.00[bc]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	25.00[bc]

*Means with the same letter are not significant at 5% LSD

Table 6 shows the number of fruits of eggplant per treatment. It was revealed in the table that there is a significant difference among the treatment means. T2 produced the highest number of fruits. This indicates that 10 tons Vermi cast + 3 application of fermented kuhol with a 10ml/liter ratio produced more fruits, thus giving a higher yield.

Table 7. Number of marketable fruits of the eggplant per treatment

Treatment	Mean
T_0 – Farmers Practice	9.00[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	40.00[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	49.00[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	44.00[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	42.00[b]

*Means with the same letter are not significant at 5% LSD

Table 7 shows the number of marketable fruits on the different rates of Vermicast supplemented with fermented golden kuhol. Based on the analysis, it is highly significant among the treatments. T2 registered as the highest mean rating of 49. This implies that this combination of Vermicast and the application of fermented golden kuhol gives a higher number of marketable fruits.

Table 8. Number of fruits non-marketable of the eggplant per treatment

Treatment	Mean
T_0 – Farmers Practice	13.00[a]
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	26.00[b]
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	29.00[b]
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	35.00[b]
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	27.00[b]

*Means with the same letter are not significant at 5% LSD

Table 8 shows the number of non-marketable fruits on Vermicast's different rates and supplemented with fermented golden kuhol. The table shows that there was a significant difference among the five treatments. T3 registered the highest mean value of 35. This implies that T3 has produced the most number of non-marketable fruits of eggplant.

Table 9. Number of insect of the eggplant per treatment

Treatment	Mean
T0 – Farmers Practice	7.00a
T1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	18.00b
T2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	24.00b
T3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	22.00b
T4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	18.00b

*Means with the same letter are not significant at 5% LSD

Table 9 shows the average number of insects attacking the eggplants per treatment. It showed in the table that there was a significant difference among the treatment means. T2 registered the highest number of insects among the treatment means. This implies that the greater number of flowers of the eggplant, the more the occurrence of the insects attack the eggplant since T2 has a greater number of fruits.

Table 10. Cost and Return Analysis

Treatment	Total Expenses	Total Sale	ROI
T_0 – Farmers Practice	140	85	55
T_1 – 5 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	200	315	115
T_2 – 10 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	300	764	364
T_3 – 15 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	350	450	100
T_4 – 20 tons Vermi cast + 3 application of fermented kuhol with a ratio of 10ml/liter	450	600	150

Table 10 shows that the highest yield was obtained from T2 with a total sale of 764 pesos with a total of expenses of 300 pesos and a net income of 364 pesos. This indicates that T2 – 10 tons Vermi cast + 3 application of fermented kuhol with a 10ml/liter ratio could contribute a better yield of eggplants.

CONCLUSIONS

The Vermicast and fermented golden kuhol were highly significantly different in the marketable fruits of eggplant 10 tons. Vermi cast + 3 application of fermented golden kuhol with a 10ml/liter ratio the greatest number of marketable fruits of eggplant.

It was also noted that the eggplants in the different treatments are significantly different in their weight (kg), height (cm) and length of fruits (cm).

RECOMMENDATIONS

Based on the gathered data, the following are recommended:

1. Eggplant is recommended in other lowland areas for its good yield specifically weight, height, length, and marketable fruits of eggplants.
2. Other organic fertilizer and other mixture of fermented golden kuhol may also be tested to come up with a better yield of eggplants and to verify the results of this study.

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