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COMPARATIVE STUDY: UTILIZATION OF USED TEA GROUNDS AS AN ALTERNATIVE FERTILIZER FOR CUBANELLE PEPPER (CAPSICUM ANNUUM) PLANT)

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ABSTRACT

PURPOSE. This study primarily aimed to determine the effects of utilization of used tea grounds as an alternative fertilizer for cubanelle pepper (capsicum annuum) plant in terms of height, number of leaves, number of cubanelle pepper, and mortality.

DESIGN/METHOD/APPROACH. The study utilized a quantitative research, true-experimental approach which was analyzed through Percentages and T-test Independent.

FINDINGS. As a result, researchers proved that Used Tea Grounds is highly effective as an Alternative Fertilizer of Cubanelle Pepper Plant in terms of height, number of leaves, number of cubanelle pepper, and mortality. Furthermore, there is a significant difference on the growth performance of cubanelle pepper plants using used tea grounds fertilizer and chemical fertilizer in terms of height, number of leaves, and number of cubanelle pepper. Hence, there is no significant difference in terms of plants' mortality.

RESEARCH LIMITATIONS/IMPLICATIONS. Sixty (60) pieces of cubanelle pepper seedlings were used as a subject of the study. The statistical treatment that was used for data analysis is T-test Independent and Weighted Average Mean. To attain the desired objectives regarding the height, number of leaves, number of cubanelle pepper, and it's mortality, the researchers used a data sheet. The data sheet is used to observe the growth performance of the cubanelle plants for weekly recording, The observation will last 77 days until the plants grow and can produce cubanelle pepper, because based on our research it will grow after 62-77 days or 9-11 weeks. The researchers did not include variables such as length and the weight of the cubanelle pepper.

ORIGINALITY/VALUE. As of now, this experimental research has proven the Effectiveness of Utilization of Used Tea Grounds as an Alternative Fertilizer for Cubanelle Pepper Plant. It is recommended to all farmers to use for their plants as an alternative fertilizer which is non-toxic, non-polluting, non-hazardous and biodegradable also makes them innovative to help their plants to be more healthier and a high quality. This study can be used as a reference for future researchers.

Keywords: Cubanelle Pepper, Height, Mortality, Number of Leaves, Tea Grounds Waste.

INTRODUCTION

Fertilizers provide nutrients such as potassium, phosphorus, and nitrogen to crops, allowing them to grow larger, faster, and produce more food. Nitrogen, in particular, is required for the growth of all organisms on Earth. Nitrogen is all around us and accounts for approximately 78% of the air we breathe. Nature struggles to replenish the nutrients in the soil in the lack of fertilizers. When crops are harvested, important nutrients are removed from the soil because they follow the crop and end up on the dinner table. Crop yields will deteriorate over time if the soil is not replenished with nutrients through fertilization. China is the world's largest fertilizer consumer. The Asian country consumed more than 45 million metric tons of nutrients in 2019. It was followed by India and the United States, each with 29.4 and 20.4 million tons.

In 2020, the Philippines' fertilizer consumption was 209.2 kilograms per hectare. Though Philippines fertilizer consumption fluctuate substantially in recent years, it tended to increase through 1971 - 2020 period ending at 209.2 kilograms per hectare in 2020. As a net importer of fertilizer, the Philippines is vulnerable to rising fertilizer prices caused by the Covid 19 pandemic, which is causing fertilizer shortages around the world, higher input costs and fuel prices, disruption of production and trade, and geopolitical disputes (Russia and Ukraine). Food and Agriculture Organization (FAO) stated that tea grounds can help to improve the plant's growth, overall health and vigor.

This problem prompted the researchers to conduct this research and create a tea grounds fertilizer, specifically a fertilizer made from tea bag waste. Instead of throwing away used tea bags grounds consider reusing them in fertilizing plants. As tea grounds decompose, they increase nutrient levels and improve soil quality because they are natural, organic matter. This increases the activity of earthworms and other beneficial microorganisms. Tea grounds added to the soil also provide benefits such as improved oxygenation, which help plants develop a stronger root system. Because plants take water and nutrients in through their root systems, the result is more vibrant, healthier plants.

THEORETICAL FRAMEWORK

This study is anchored through these following theories: A Theory for fertilizer response (T.J. Cleaver et al., 2009) represents a model derived that relates yield to levels of applied fertilizer in terms of parameters that have direct physical meaning. N8, P8, and K8 define the contribution of the soil to the supply of nitrogen, phosphorus and potassium for plant growth; BN, BP and BK define the responses to nitrogen, phosphorus and potassium fertilizer at low nutrient levels and aN is the level of nitrogen required to raise the osmotic pressure sufficiently to prevent growth. Additionally, organic fertilizers are naturally available mineral sources that contain moderate amount of plant essential nutrients. They are capable of mitigating problems associated with synthetic fertilizers. They reduce the necessity of repeated application of synthetic fertilizers to maintain soil fertility. They gradually release nutrients into the soil solution and maintain nutrient balance for healthy growth of crop plants. They also act as an effective energy source of soil microbes which in turn improve soil structure and crop growth. Organic fertilizers are generally thought to be slow releasing fertilizers and they contain many trace elements. They are safer alternatives to chemical fertilizers.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study is shown in the research paradigm which illustrates the expected outcomes of the study on the utilization of tea ground as an alternative fertilizer to boost the growth of the chosen plants which are Cubanelle pepper.

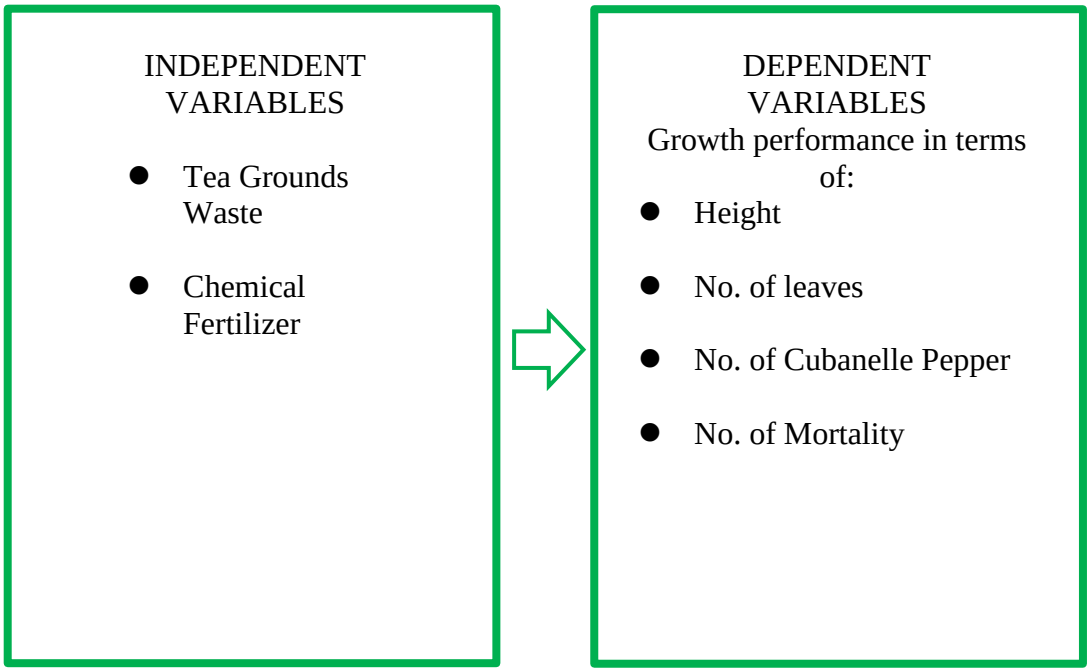

Figure 1. Research Paradigm

Figure 1 showed the Independent Variable and Dependent Variable model of Comparative Study of the Utilization of Used Tea Grounds as an Alternative Fertilizer for Cubanelle Pepper. The independent variable indicated the necessary materials which are tea grounds waste and chemical fertilizer that would be compare to each other. The dependent variable stated the growth performance in terms of height, number of leaves, number of cubanelle pepper and number of mortality. Overall, this conceptual framework explained how we conducted our research study.

REVIEW OF RELATED LITERATURE

According to I. P. Olasesan, et.al., (2022), globally there is 1.4 billion tons of edible material—or one-third of the world's food production—is wasted each year. In Nigeria, 7.5 million tons of wastes were generated in the most recent study on food waste, and each person produced roughly 1370 kg of waste annually. Food waste increases as a result of the world population's rapid growth throughout the years. To meet population demand and avoid food waste, the variety of foods should be increased. Food waste is solely handled in Nigeria by being dumped straight into landfills, which causes the release of landfill gas and contributes to global warming. The goal of the study was to conduct qualitative and quantitative analysis on the synthesis of organic fertilizer from anaerobic digestion of food waste. The project's goal is to determine the proportion of phosphate, ammonium, as well as nitrate in various types of organic fertilizer made from the preservative rice bran (BR); cucumber, dairy, bread, tea bags, orange, eggs, and bitter leaves (BC); yam, water leaf, onion, coffee grinds, wild lettuce, banana

(BY); and effective microorganisms (IMOs) (BI) using the bokashi method; and to study the generation and consumption of these nutrients. N. Ozdemir et. al., (2019) explained that the main objective of the study was to find out the effects of various organic matter sources such as bio-solid (BS) and tea waste (TW) on macro nutrient content of eroded soils. In order to determine different soil erodibility levels (slightly, moderately and severely), erosion ratio (ER) and soil erodibility factor (K) parameters were used. Soil samples used in this research were taken from bulk surface (0–20 cm depth) located on agricultural lands of Asagi Aksu village that is 20 km far from Samsun province in the north part of Turkey. These lands have been used for agricultural activity. Some properties of the soil classified as Vertic calciudoll were determined as follows; fine in texture, organic matter content varies between 0.83% and 0.90%. In addition, pH and EC values of these soils are 8.0–8.1 and 0.64–0.79 dSm − 1 respectively. This study was conducted by applying four different doses of BS and TW (0%, 2%, 4% and 6%) in eroded soils under greenhouse conditions. Each treatment was replicated three times in a split block design. After 18 weeks incubation period associated parameters were determined in all pots. According to analysis results, it was found that while BS treatments increased total N, available P and exchangeable K content of all eroded soils compared to control treatment, effectiveness of TW on P is very low in slightly and moderately erosion levels. BS and TW applications increased K content in soils. However, it was determined not significant statistically between effectiveness of these various organic residues whereas, N and P values significantly correlated with BS and TW ($P < 0.05$). In addition, change of N, P and K values depending on the application doses and soil erosion levels were found statistically significant ($P < 0.001$). Furthermore, the synergistic effects of these two bio-fertilizers were investigated. Our objective was to replace 20% of mineral fertilizers with bio-fertilizers in a soilless culture system. The use of 80% mineral fertilizers, in combination with mycorrhiza and bacteria, provided a 32.4% higher yield than the control (100% mineral fertilizer without bio-fertilizers). Moreover, the concentrations of N, P, K, Ca, Mg, Fe, Mn, Zn, and Cu in the leaves of pepper plants fed with the reduced mineral fertilizers combined with bio-fertilizers were higher than that of the control. In addition, fruit parameters, such as fruit weight, diameter, volume, the electric conductivity of the fruit juice, and total soluble solids, were significantly higher in this treatment compared to the control. Using 80% mineral fertilizer with only bacteria provided a 24.2% higher yield than the control. In conclusion, mineral fertilizers were successfully reduced by 20% using bacteria and mycorrhiza. These results provide an eco-friendly approach to a sustainable environment.

RESEARCH QUESTIONS

This study aims to determine The Effectiveness of an Alternative Fertilizer using Tea Grounds Waste as a Solution to Boost the Growth of Cubanelle Pepper Plants.

Specifically, it sought to answer the following questions:

1.What is the effect of tea bag waste fertilizer to cubanelle pepper plants in terms of:

1.1 Height;

1.2 Number of leaves;

1.3 Number of cubanelle pepper; and

1.4 Mortality?

2. What is the effect of chemical fertilizer to cubanelle pepper plants in terms of:
2.1 Height;
2.2 Number of leaves;
2.3 Number of cubanelle pepper; and
2.4 Mortality?
3. What is the difference between tea ground waste fertilizer and chemical fertilizer to the effect on cubanelle pepper plants in terms of:
3.1 Height;
3.2 Number of leaves;
3.3 Number of cubanelle pepper; and
3.4 Mortality

HYPOTHESIS

At 0.05 level of significance, the hypothesis of this study will be tested:
Ho: There is no significant difference between tea grounds waste fertilizer and chemical fertilizer in terms of mortality.

METHODOLOGY

A. Research Design

The researchers conducted a quantitative study using experimental research design. Aiming to create an alternative fertilizer using tea grounds waste and identify its height, number of leaves, number of cubanelle pepper and its mortality.

B. Research Locale

This research study is conducted in Siquijor St., Mauban, Quezon. The researchers chose this setting because it provides them the planting area and also the observation area of the said fertilizer and vegetables that will be used.

C. Subject and Respondents of the Study

The Grounds Waste, Soil, Recycled Plastic Bottles, and Cubanelle Pepper Seeds are used for this experimental study. 30 pieces of Cubanelle Pepper Seeds for our conventional fertilizer and another 30 pieces of Cubanelle Pepper Seeds for chemical fertilizer were used to conduct this experiment. The researchers are the participants of this study.

D. Research instrument

Data is gathered using observation datasheets. It is composed of tests to measure the height, number of leaves, and number of cubanelle pepper, and using checklists for plants' mortality of cubanelle pepper plants using tea grounds waste as an alternative fertilizer. Another important medium or instrument used to gather data is chemical fertilizer that is often used as fertilizer for plants. The researchers used chemical fertilizer to compare and differentiate it with the tea ground waste fertilizer.

Statistical Treatment of Data

The data gathered in this study was subjected to the following statistical treatment:

Weighted Mean (WM)

The collected data were treated statistically by using standard statistical tools. Weighted mean (WM) was applied in measuring the impact of utilization of used tea grounds as an alternative fertilizer for cubanelle pepper in terms of plants' height, number of leaves, and number of cubanelle pepper using used tea grounds fertilizer and chemical fertilizer.

Mean

Mean was applied in measuring the impact utilization of used tea grounds as an alternative fertilizer for cubanelle pepper. The mean is calculated by taking the sum of each plants' height, number of leaves, and number of cubanelle pepper by weeks, then dividing by eleven weeks.

Two Sample T-test Independent

Two sample t-test was applied to compare the means of traditional fertilizer which is the chemical fertilizer and conventional fertilizer which is the used tea grounds fertilizer. It is used to measure the impact of utilization of used tea grounds as an alternative fertilizer for cubanelle pepper in terms of plants' height, number of leaves, and number of cubanelle pepper after getting the WM of the score. The 5 percent level of significance, that is, $\alpha = 0.05$, is the most common used level of significance value.

E. Research Procedure

The researchers started the experiment by gathering the materials needed to create the product alternative fertilizer. The researchers will test the alternative fertilizer using tea ground waste to determine its height, number of leaves, number of cubanelle pepper, and mortality. After that the researchers will test the chemical fertilizer and compare them in terms of height, number of leaves, number of cubanelle pepper, and mortality.

After the researchers have conducted the experiment and data collecting, they will analyze the data gathered. The results of the experiment and the data collection procedure will then be interpreted and concluded by the researchers.

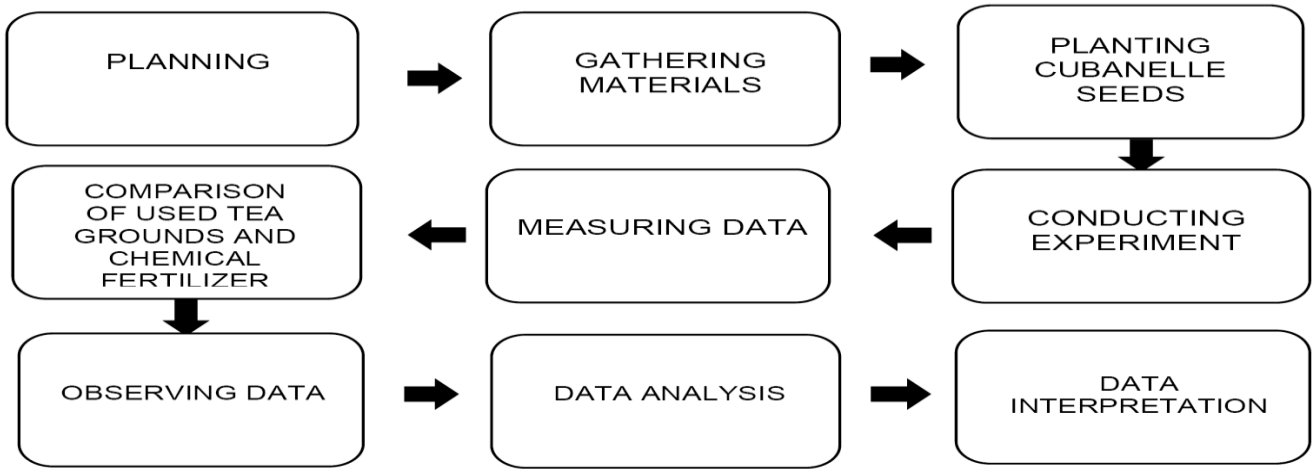

Figure 5 shows the flow chart diagram of the research procedure

RESULTS AND DISCUSSIONS

Table 1. The mean of height (in mm) of the cubanelle pepper plant using tea grounds waste fertilizer and chemical fertilizer in eleven weeks.

Plant	Tea	Chemical
1	349	169.91
2	295.09	205.91
3	328.64	237.82
4	296	237.09
5	273.82	220.27
6	327.27	232.46
7	309.91	322.18
8	251.82	204.91
9	247.55	153.73
10	255.09	123.82
11	237.82	247.73
12	325.46	210.73
13	230.91	207.64
14	248.73	213.82
15	260.36	233.18
16	242.46	241.73
17	275.73	247.64
18	263	217.36
19	313	257.36
20	220.55	208.64
21	278.46	275.36
22	240.89	241.18
23	259.36	256.46

24	258.64	242.91
25	276.36	178.46
26	280.82	232.82
27	297.73	216.55
28	310.82	242.09
29	223.64	178.27
30	213.73	181

Table 1 shows the mean height of 30 cubanelle pepper plants using tea grounds waste fertilizer, and chemical fertilizer within 11 weeks of conducting this study. As we observed, the cubanelle pepper plants became taller and taller. We got the mean height of each plant; it continued to grow until the eleventh week, and gratefully, we got a higher mean height of cubanelle pepper plants using tea ground waste fertilizer than chemical fertilizer.

Table 2. The mean of number of leaves of the cubanelle pepper plant using tea grounds waste fertilizer and chemical fertilizer in eleven weeks.

Plant	Tea	Chemical
1	29.73	9.55
2	36.91	17.82
3	22.55	14.91
4	36.64	18.73
5	27.73	12.18
6	27.36	22.18
7	28.27	21.55
8	29.91	17.1
9	20.91	14.27
10	23.73	12.46
11	31.1	15.55
12	28.82	15.82
13	27.82	16.27
14	28.45	17.36
15	24.73	17.36
16	20.55	15.18
17	32.45	22.82
18	29.91	15.82
19	32.82	13.18
20	27.36	27.27
21	27.82	17.1
22	22.91	19.55

23	22.82	23.1
24	26.64	21.55
25	35.64	20.18
26	28.64	23.55
27	32.36	18.46
28	24.18	22.64
29	25.45	19.91
30	19.45	21.64

Table 2 shows the mean number of leaves of 30 cubanelle pepper plants using tea grounds waste fertilizer, and chemical fertilizer within 11 weeks of conducting this study. As we observed, the leaves of cubanelle pepper plants are increasing. We got the mean number of leaves of each plant; it continued to increase until the eleventh week, and gratefully, then we got a greater mean number of leaves of cubanelle pepper plants using tea ground waste fertilizer than chemical fertilizer.

Table 3. The mean of number of cubanelle pepper plant using tea grounds waste fertilizer and chemical fertilizer in eleven weeks.

Plant	Tea	Chemical
1	0.27	0
2	0.27	0.23
3	0.55	0
4	0	0
5	0	0
6	0.73	0.23
7	0.73	0.55
8	0.45	0
9	0.1	0
10	0.1	0
11	0.1	0
12	0.82	0.27
13	0.36	0
14	0.1	0
15	0.18	0.18
16	0	0
17	0.18	0
18	0.36	0.27
19	0.29	0.55
20	0.55	0.18
21	1.64	0.55
22	0.55	0.55
23	0.45	0

24	0.18	0
25	1.64	0
26	0.18	0.91
27	1	0.55
28	1.36	0.27
29	0.1	0.18
30	0. 55	0

Table 3 shows the mean number of cubanelle pepper plants using tea grounds waste fertilizer, and chemical fertilizer within 11 weeks of conducting this study. As we observed, the number of cubanelle pepper are increasing. We got the mean number of cubanelle pepper of each plant; it continued to increase until the eleventh week, and gratefully, then we got a greater mean number of cubanelle pepper using tea ground waste fertilizer than chemical fertilizer.

Table 4. The mortality of cubanelle pepper plant using tea grounds waste fertilizer and chemical fertilizer.

Week(s)	TEA	CHEMICAL
1	30	30
2	30	30
3	30	30
4	30	30
5	30	30
6	30	30
7	30	30
8	30	30
9	30	30
10	30	30
11	30	30

Table 4 shows the mortality of cubanelle pepper plants using tea grounds waste fertilizer and chemical fertilizer within 11 weeks of conducting this research. Gratefully, all of the cubanelle pepper plants are alive and still continue to grow as we can see in the result. As a result there is no significant difference in terms of mortality.

Table 5. t-Test: Two-Sample Assuming Equal Variances in terms of Height.

Fertilizer	n	Mean	Standard Deviation (SD)	t	2-tailed test (df=58, a= 0.05) Critical Value (CV)	p-value	Decision
Tea	30	273.08	16.53				
Chemical	30	221.3	14.88	5.41	2	1.26E-06	Reject Ho

Table 5 shows t-Test using Two-Sample Assuming Equal Variances in terms of height. The 30 cubanelle pepper plants that used tea grounds waste fertilizer has a higher mean (M=273.08, SD=16.53) compared to the 30 cubanelle pepper plants that used chemical fertilizer (M=221.3, SD=14.88). However, this difference is significant because the null hypothesis is rejected, t(58) = 5.41, p(1.26E-06) < 0.05. In other words, tea grounds waste fertilizer is more effective in terms of height.

Interestingly, the claim was supported by the study of K. Remya (2018), the present study is an attempt to recycle food waste especially tea waste, i.e., an attempt was made to study the effectiveness of tea waste as a fertilizer in the germination and growth rate of Vigna radiata (Green gram). Non-polar and polar solvent extracts of tea waste were made by hot continuous soxhlet extraction. The extract was lyophilized and made up to known volume by DMSO and water. Various poly phenol contents in the extracts were quantified and the results revealed significant amounts of phenols, flavonoids and tannins. Next phase of the study was analysis of effect of both the extracts on seed germination and growth. Effect of 1% and 5% concentration of both extracts and controls were examined in germination and growth of seeds. Highest percentage of seed germination was observed in 5% aqueous extract (88%) followed by 1% aqueous extract and control on 3rd day. Petroleum ether extract showed comparatively low germination rate. After 7th day the growth rate of seedlings, length of leaf lamina, total protein content and growth of root system were analyzed. 5% aqueous extract treated seedlings showed highest height, profuse roots, highest protein content (21.17 mg/g) supporting the role of extract as fertilizer. From the results it can be concluded that the tea waste can be used as a potent fertilizer. Furthermore it is an effective way of recycling a bio waste in a useful manner. Further studies, experiments and awareness are recommended for large scale recycling of tea waste as fertilizer.

Table 6. t-Test: Two-Sample Assuming Equal Variances in terms of No. of Leaves.

Fertilizer	n	Mean	Standard Deviation (SD)	t	2-tailed test (df=58, a= 0.05) Critical Value (CV)	p-value	Decision
Tea	30	27.79	4.58				
Chemical	30	18.17	4.01	8.66	2	4.86E-12	Reject Ho

Table 6 shows t-Test using Two-Sample Assuming Equal Variances in terms of number of leaves.The 30 cubanelle pepper plants that used tea grounds waste fertilizer has a greater mean (M=27.79, SD=4.58) compared to the 30 cubanelle pepper plants that used chemical fertilizer (M=18.17, SD=4.01). However, this difference is significant because the null hypothesis is rejected, t(58) = 8.66, p(4.86E-12) < 0.05. In other words, tea grounds waste fertilizer is more effective in terms of number of leaves.

According to X. Kang et. al, (2020) organic fertilizer has application on growth and yield. Approximately 162 vines were selected in a completely random design with nine fertilization treatments (PK; NK; NP; NPK; 2NPK; N2PK; NP2K; NPK + OM (organic matter)). Data on leaf

number, leaf area, stem diameter, photosynthetic parameters, leaf N, P and K, chlorophyll content, yield and fruit quality were collected from individual kiwi vines for each treatment during the years 2011–2013. The application of inorganic fertilizer significantly increased fruit yield, leaf number, and leaf area and stem diameter increment as well as leaf photosynthetic rates and the concentrations of N, P and K in the leaves. However, the fruit yields were reduced in the unbalanced fertilizer treatments, NP, NK, and PK and in excess nutrient treatments, 2NPK, N2PK, NP2K, in contrast to the optimum NPK treatment. This was due to lower leaf photosynthetic rates and fewer photo-assimilates being available to the fruit.

Table 7. t-Test: Two-Sample Assuming Equal Variances in terms of No. of Cubanelle Pepper.

Fertilizer	n	Mean	Standard Deviation (SD)	t	2-tailed test (df=58, a= 0.05)		
					Critical Value (CV)	p-value	Decision
Tea	30	0.46	0.46				
Chemical	30	0.19	0.25	2.82	2	0.007	Reject Ho

Table 7 shows t-Test using Two-Sample Assuming Equal Variances in terms of number of cubanelle pepper. The 30 cubanelle pepper plants that used tea grounds waste fertilizer has a greater mean (M=0.46, SD=0.46) compared to the 30 cubanelle pepper plants that used chemical fertilizer (M=0.19, SD=0.25). However, this difference is significant because the null hypothesis is rejected, $t(58) = 2.82$, $p(0.007) < 0.05$. In other words, tea grounds waste fertilizer is more effective in terms of number of cubanelle pepper.

Interestingly, this claim was supported by Ouellette, N. that the fertilizer treatments evaluated were: (1) vermicompost tea (from coffee grounds; 12,600 mg/kg N), 2) Miracle-Gro fertilizer (16,100 mg/kg N), 3) Organic Miracle-Gro fertilizer (6,900 mg/kg N), and 4) no fertilizer (0 mg/kg N). Water was applied through drip irrigation daily and fertilizer treatments were applied in 1.9 L of water for each plant once a week from transplant to the end of harvest. Ripe tomato fruit were harvested eight times from June to August. Plant vigor, chlorophyll content, and marketable yields were greater ($P \leq 0.05$) when Miracle-Gro and Organic Miracle-Gro were used as the fertilizer source. Subsequently, the no fertilizer and vermicompost tea application resulted in less production as lower available nutrient content (especially N) in these treatments reduced tomato plant vigor and fruit yield. Although, the analysis indicated that the verimcompost tea had a relatively high amount of N, most was in the organic form and was not readily available for plant uptake. This study indicates that acceptable tomato yields can be achieved in a three-inch extensive green roof with adequate fertilizer applications.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY OF FINDINGS

The following findings are summarized based on the data and other multifarious information obtained in the study:

1. The growth performance of botanical fruits but culinary vegetables, cubanelle pepper on experimental set up in terms of height, number of leaves, and number of cubanelle pepper increased.
2. The survival rate of the botanical fruits but culinary vegetables (cubanelle pepper) has increased under the experimental set up. Chemical and Tea ground waste have a survival rate of 100%. Based on the results of the experiment set up, it proves that the tea ground waste is very effective in the green method of growing botanical fruits but culinary vegetables (cubanelle pepper).
3. There is significant difference in the growth performance in terms of height, number of leaves, and number of cubanelle pepper of the two experimental method of vegetables (Chemical fertilizer for cubanelle pepper and Tea ground waste fertilizer for cubanelle pepper) under the experiment set up.
4. There is no significant difference in terms of mortality of the two experimental vegetables when compared according to baseline data.

CONCLUSIONS

Based on the findings, the following conclusions were made by the researchers:

1. To make tea grounds as alternative fertilizer, first you have to collect tea bags waste then expose to the sun for 1 day.
2. From the last observation and result (week 11) the growth performance of cubanelle pepper plant using tea ground waste fertilizer in terms of:

Height- The 30 cubanelle pepper plants that used tea grounds waste fertilizer has mean of 273.08.

Number of leaves- The cubanelle pepper using tea ground waste fertilizer has mean 27.79 number of leaves based on week 11.

Number of cubanelle pepper- Using tea grounds waste fertilizer within 11 weeks of conducting this study. There is 66 grown cubanelle pepper.

Mortality -Cubanelle pepper plants using tea grounds waste fertilizer within 11 weeks of conducting this research. Gratefully, all of the cubanelle pepper plants are alive and continue to grow as we can see in the result.

3. From the last observation and result (week 11) the growth performance of Cubanelle pepper plant using chemical fertilizer in terms of:

Height- The 30 cubanelle pepper plants that used chemical fertilizer has mean of 221.3.

Number of leaves - The cubanelle pepper using chemical fertilizer has 18.17 mean of number of leaves based on week 11.

Number of Cubanelle pepper- Using chemical fertilizer within 11 weeks of conducting this study. There is 25 grown cubanelle pepper.

Mortality - Cubanelle pepper plants using chemical fertilizer within 11 weeks of conducting this research. As we observed, all of the cubanelle pepper plants are alive and continue to grow.

IMPLICATIONS AND RECOMMENDATIONS

In view of the forgoing findings and conclusions, the following points were hereby recommended:

1. The study should test the effect of the number of used tea grounds to the growth of cubanelle pepper plants.
2. It is recommended to all farmers to use for their plants as an alternative fertilizer which is non-toxic, non-polluting, non-hazardous and biodegradable.
3. This study can be utilized to help landscapers to be more innovative in landscaping.
4. The study may also be used as a reference for future studies.

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