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Utilizing Leafy Vegetable Waste for Production Compost as a Mean of Planting Media

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A B S T R A C T

The Sabah State Government in 2018 noted that the state was facing significant challenges in managing its solid waste, due to factors such as limited resources, inadequate infrastructure, and inadequate public awareness of waste management practices The total amount of municipal solid waste generated in Sabah was reported to be 2,062,390 kg per day. Composting is decomposing organic matter, such as food scraps, yard waste, and other natural materials, into a nutrient-rich soil amendment that can be used to improve soil fertility and structure. This study aimed to evaluate composted leafy vegetable waste as planting media. This research was conducted at the Faculty of Sustainable Agriculture. There were 4 treatments for this research, namely T1: 100% leafy vegetable waste, T2: 50% leafy vegetable waste + 50% compost matured chicken manure, T3: 50% leafy vegetable waste + 50% peat moss, and T4: 50% leafy vegetable waste + 50% topsoil. Data collection in this research includes temperature, moisture content, C/N ratio, pH, electrical conductivity (EC), sowing green mustard, and cost. Data were analyzed using SAS 9.4 and presented by Tukey at p>0.05. The findings of this study have important implications for the sustainable management of vegetable waste, as peatmoss provides an alternative solution to waste disposal while promoting soil health and agricultural productivity.

1. INTRODUCTION

1.1. Research Background

Solid waste management is a major challenge faced by many countries, including Malaysia. According to the Sun Daily, Malaysia generates approximately 38,699 tons of solid waste every day, which translates to an average of about 1.17 kg per person. This data indicates the significant amount of waste generated by the country daily. Based on a media report on waste collection data, waste generation in Malaysia has been increasing over the years. In 2019, the country generated around 37,462 tons of waste daily. The state government has noted that the inadequate infrastructure, lack of public awareness of waste management practices, and limited resources have led to significant difficulties in managing the solid waste generated in the state.

In Sabah, the solid waste generation in Sabah was reported to be 2,062,390 kg per day [1]. This indicates the total amount of waste generated within the region daily. It's worth noting that this value tends to increase each year, reflecting the growing waste generation trends over time. Additionally, the waste generation rate in Sabah is stated to be 0.7 kg per capita. This figure represents the average amount of waste produced by everyone within the population of Sabah. Peatmoss, on the other hand, is an organic material that is commonly used in gardening and agriculture due to its ability to improve soil structure, retain water, and provide nutrients to plants. It is derived from peat bogs and is widely available in many parts of the world, including Malaysia. According to a study [2] peatmoss can significantly improve soil fertility and enhance the growth and yield of crops.

Composting is decomposing organic matter, such as food scraps, yard waste, and other natural materials, into a nutrient-rich soil amendment that can be used to improve soil fertility and structure. It is a sustainable way of managing waste and can help reduce the amount of solid waste that is sent to landfills. According to a study [3], composting can significantly reduce the volume of organic waste and improve soil health.

In recent years, organic waste management has been a pressing concern due to its immense environmental impact. Because landfill disposal and incineration contribute to greenhouse gas emissions and pollution, they are not viable long-term options. Therefore, innovative, and sustainable organic waste treatment systems are required [4]. Microorganisms are used in microbial decomposition to break down organic waste and convert it into compost Composting can be utilized to manage a variety of organic waste categories, including vegetable waste.

Vegetable waste is a significant contributor to organic waste, and composting is an environmentally preferable option [5]. Utilizing microorganisms such as bacteria, fungi, and actinomycetes, microbial composting is the process of decomposing organic matter in a compost mound. As a result of digesting organic matter, microorganisms generate heat and carbon dioxide. Pathogens and weed seeds can be destroyed by composting heat, resulting in a more stable and secure product [6]. Compost can be further processed to generate peatmoss, a valuable and in-demand horticultural product. Peatmoss has unique qualities that make it an excellent medium for plant growth, such as a high capacity for water retention and nutrient retention. Numerous studies have investigated the possibility of producing peat moss from vegetable detritus using microbial composting processes. For instance, [7] evaluated the use of composted vegetable waste as a substitute for peat moss in a soilless growing system Compost made from vegetable residue possesses similar physical and chemical properties to peat moss as planting media and could be used as an alternative in horticulture. [8] conducted a second study in which they investigated the use of a variety of composting techniques to produce compost from vegetable refuse. The researchers found that the produced compost had a high nutrient content and could be used as a soil amendment. Using microbial decomposition processes to convert vegetable waste into peat moss provides a sustainable alternative for both organic waste management and the production of horticultural products..

1.2. Literature Review

Waste vegetable management is a significant environmental issue in Malaysia, with food waste accounting for 45% of the country's total waste generated [9]. Improper disposal of waste vegetables can have detrimental effects, including environmental pollution, greenhouse gas emissions, and health hazards. A study by [10] highlighted the insufficient knowledge among the public regarding waste reduction, waste segregation, and recycling, which contributes to the improper disposal of waste vegetables. Peat moss has traditionally been one of pot culture's most widely used growing substrates. Its popularity stems from its unique properties, which make it well-suited for plant growth and cultivation. Peat moss, sphagnum peat moss, is derived from decomposed plant material in peat bogs. One of the key advantages of peat moss as a growing substrate is its excellent water retention capacity. It can absorb and hold a significant amount of water, providing a steady moisture supply to plants [11]. Composting is another viable solution for waste vegetable management. Research, like the study by [12], has demonstrated the effectiveness of using waste vegetables as a peat replacement. Composting not only diverts waste from landfills but also produces nutrient-rich soil that can be utilized in agriculture. This approach offers a sustainable solution to waste management while promoting soil fertility and reducing environmental pollution.

Composting is a beneficial process with numerous environmental, economic, and social benefits. According to a study by [13], composting can help to reduce greenhouse gas emissions, conserve natural resources, and promote soil fertility. Composting also reduces the volume of waste going to landfills, reducing the cost of waste management. Composting can also provide job opportunities and create a sustainable source of fertilizer for agriculture.

1.3. Research Objective

The research aimed to evaluate the quality of the planting media produced from leafy vegetable waste.

2. MATERIALS AND METHODS

2.1. Material and Tools

The study was conducted at the Faculty of Sustainable Agriculture, University Malaysia Sabah, Sandakan campus. As for the duration of the study, the study starts in July and ends in November 2023. The study takes about two (4) months to be completed which includes all processes of process composting in the fields including the preparation of material, collecting waste of vegetables, and chicken manure making planting media using the composted method, data collection, and analysis. This research was conducted at the rain shelter 7 of the Faculty of Sustainable Agriculture. The waste of vegetables collected at Pasar Batu 8 Sandakan is transported to the composting facility at FPL. Additionally, peat moss, chicken manure, and topsoil are supplied by Pusat Ladang FPL. The preparation process involves chopping vegetable waste into smaller pieces, which helps accelerate the composting process by increasing the surface area of the waste before the composting process. The chopped vegetable waste is then carefully placed into a foam box, where the composting process takes place. In the foam box, the main material is added using a plastic container to measure volume by volume (v: v).

First experiment with four treatments. Treatment 1: 100% waste of vegetables. This treatment involves using 100% waste of vegetables as a substrate. Treatment 2: 50% waste of vegetables + 50% chicken manure. This treatment involves using a mixture of 50% waste of vegetable and 50% chicken manure as a substrate. Treatment 3: 50% waste of vegetable + 50% peatmoss. Treatment 4: 50% waste of vegetable + 50% soil. Treatment 4 involves mixing 50% waste of vegetable with 50% soil. The first experiment had 4 treatments, and each treatment will have 5 replicates, respectively. Temperature readings of the compost were recorded using a compost thermometer. The data collection involved taking readings every four days at 6.30 a.m. and the compost was turned every 3-5 days and kept consistently moist [14]. The water content of the soil sample is then determined by calculating the difference between the weight of the initially moist soil and the weight of the soil after the drying process, representing the amount of water lost during the procedure [15]. Calculate the moisture content using the formula:

$$\text{Moisture Content (\%)} = \frac{W-d}{d} \times 100$$

W = wet weight of the sample
d = weight of the sample after drying

To determine the pH (Azim *et al.*,2018). Then, the sample was entered into a machine CHN analyzer at the Laboratory

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Faculty of Sustainable Agriculture in Sandakan. After data on carbon, hydrogen, and nitrogen from the CHN analyzer are obtained, the C/N ratio data for carbon will be divided into data nitrogen [16].

In the second experiment, after producing planting media from leafy vegetable waste with four different treatments, mustard green seeds will be sown using seed trays for 7 days to evaluate the quality of the planting media for each treatment. Due to Treatment 1 which 100% leafy vegetable waste cannot used as planting media, it will change to 100% peatmoss. The seed used an F1 hybrid to determine the percentage of germination and plant height by using the planting media that produces leafy vegetable waste. First, the seed will be soaked overnight, and then the floatable seeds are discarded, while sinking seeds are used as planting seeds. Finally, the seed was sown in the seed tray for seven days, and the data was collected [17]. The cost was collected to compare the price of planting media at the market and the cost of planting media that produces leafy vegetable waste [18].

2.2. Analysis Data

The data was analyzed using the software SAS 9.4. The data was analyzed using Tukey at $P \leq 0.05$ to test for significant differences between the treatments. Experimental design that used Complete Randomize Design (CRD).

3. RESULT AND DISCUSSION

3.1. Temperature

The stage maturity composting system is shown in Figure 1. In treatment 1, which involved solely leafy vegetable waste, the temperature began at 35°C on day 0 and gradually dropped to 33°C by day 4. During days 8 to 16, there was a consistent temperature of 31°C; on days 20 and 24, the temperature dropped slightly to 30°C. Treatment 2 used a mixture of leafy vegetable waste and composted mature chicken manure. The temperature began at 36°C on day 0 and reached its highest point at 43°C on day 4 during the thermophilic phase. It gradually decreased to 38°C on day 8, 37°C on day 12, and 35°C on both days 16 and 20, indicating the cooling phase. After 24 days, the temperature reached a cool 31°C, indicating a significant milestone. Treatment 3 used a mixture of leafy vegetable waste and peat moss. The temperature started at 35°C on day 0 and reached its highest point at 42°C on day 4 during the thermophilic phase. The temperature experienced significant variations in the lower thirties from days 8 to 23 before finally stabilizing at 30°C on day 24, suggesting a state of maturity. The temperature profile of Treatment 4 remained consistent throughout the experiment, using a combination of leafy vegetable waste and topsoil in equal proportions. The temperature began at 35°C on day 0 and saw a slight rise to 36°C on day 4 during the thermophilic phase. Between days 8 and 20, the temperature remained steady at 32°C as it cooled down and then gradually dropped to 30°C by day 24, suggesting that it had reached maturity.

The composting treatments involving leafy vegetable waste exhibited varying timelines for reaching temperature stability and maturation. The 100% leafy vegetable waste treatment demonstrated remarkable efficiency, achieving temperature equilibrium within just seven days, highlighting its effectiveness in rapidly transforming waste into valuable resources. The high nitrogen content can lead to an initial spike in microbial activity, potentially causing an increase in temperature, which then needed time to stabilize and reach equilibrium. The slower transition to maturation in Treatment 2 might be attributed to this initial imbalance in the composting process, which required extra time for the system to adjust and stabilize [19]. As a result, a temperature equilibrium is achieved within a remarkable seven days, underscoring the effectiveness of the treatment method in rapidly transforming leafy vegetable waste into valuable resources. Treatment 3, a combined 50% leafy vegetable waste and 50% peat moss, also reached stability on day 7. The presence of peat moss, known for its ability to retain moisture and provide a stable environment for decomposition, likely contributed to the quick stabilization, enabling the mixture to mature early. Treatment 4, comprised of 50% leafy vegetable waste and 50% topsoil, achieved temperature stability and maturation by day 7. Incorporating topsoil, rich in microbial activity, could have facilitated a robust decomposition process, resulting in early maturation.

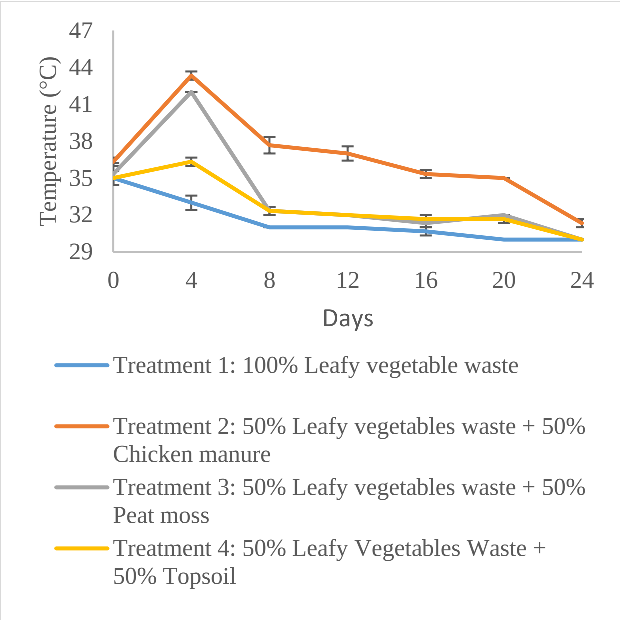

Figure 1. Stage maturity of compost temperature by day for 4 treatments

3.2. Moisture Content

Based on the data obtained from this research, Figure 2, in Treatment 1 (a), which is 100% leafy vegetable waste, it started at 14% on Day 0 and had small changes over time. On Day 4, the moisture level reached 14.33%, but then returned to 14% on Day 8. It slightly increased to 14.67% on Day 12 but decreased to 14.33% on Day 16. Finally, it stabilized at 14% on both Day 20 and Day 24. In Treatment 2 (b), a combination of 50% leafy vegetable waste and 50% composted mature chicken manure. On Day 0, the moisture content was recorded at 33.67%. It then increased to 35% on Days 8 and 12. However, it decreased to 32% on Day 20 before rising again to 33% on Day 24. Next, Treatment 3 (c), which consisted of a combination of 50% leafy vegetable waste and 50% peat moss, began with a percentage of 17.33 on Days 0 and 4. It remained constant at 17.33% on Day 4. However, on Day 8, it increased to 20.33%. Next, on Day 12, it decreased to 18.33%. On Day 16, it slightly decreased to 17.67%. Then, on Day 20, it increased to 19.33%, and finally, on Day 24, it further increased to 19.67%. Finally, Treatment 4 (d) started with a mixture of 50% leafy vegetable waste and 50% topsoil. On Day 0, the moisture content was 46.33%. Over the next few days, it increased to 47% on Day 4 and then rose to 50.67% on Day 8. However, it slightly decreased to 49.33% on Day 12. On Day 16, the moisture content remained constant at 50%. But on Day 20, it decreased to 49% and stayed the same on Day 24. This indicates that Treatment 4 consistently had a higher moisture content compared to the other treatments throughout the entire period.

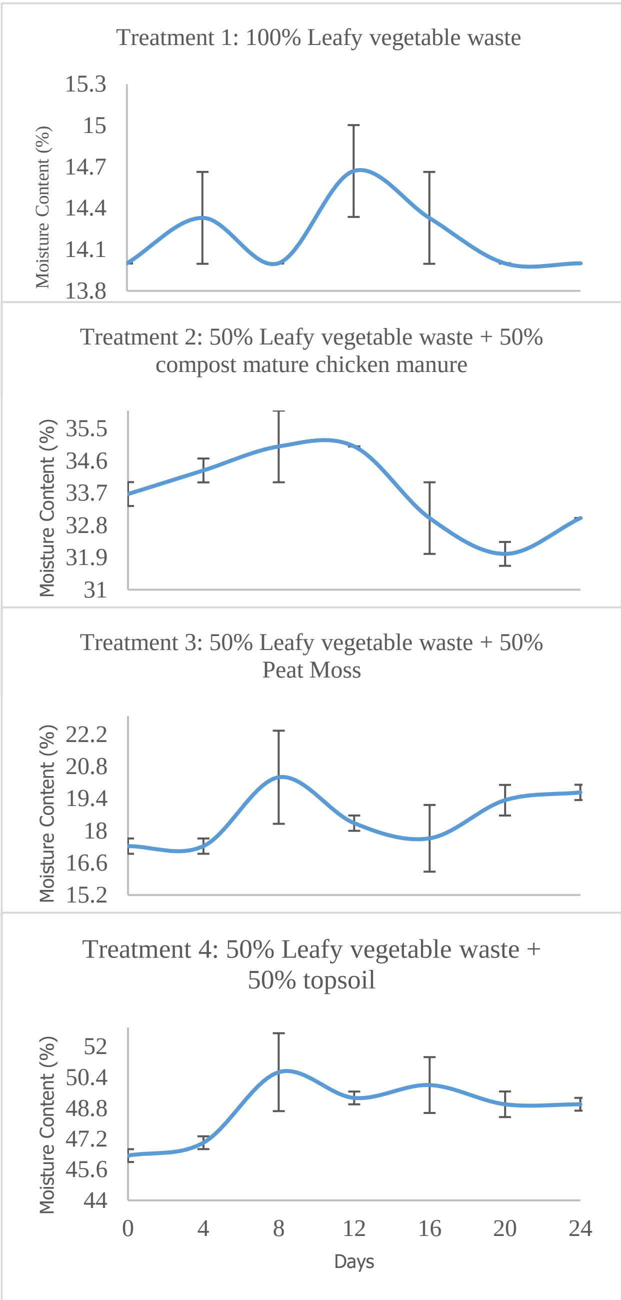

Figure 2. Stage of compost matured of moisture content rehydration if allowed to dry out. Therefore, monitoring and maintaining adequate moisture levels during composting is crucial to facilitate decomposition.\

Adjustments may be needed depending on environmental conditions and the specific composition of the waste materials [20]. Regular monitoring and adjustments, if needed, will help maintain the proper moisture content [21]. Excessive moisture can lead to anaerobic conditions and unpleasant odors. So, Proper turning and aeration of the compost pile can help regulate moisture levels [22]. Leafy vegetable waste with topsoil, the moisture content around a compost mixture of leafy vegetable waste and topsoil typically needs to fall within the range of 50-60% by weight for effective composting. However, the specific moisture content can vary depending on several factors, including the moisture level of the initial leafy vegetable waste when mixing leafy vegetable waste with topsoil, moisture management becomes important, too, but the moisture content of the waste materials may influence it. Leafy vegetables high moisture content exceeding 90% of their weight due to various factors. Leafy vegetable waste with peat moss, a moisture content of around 40-50% by weight, is recommended for effective composting. Peat moss can initially hold a lot of moisture, but it can also become quite dry and resistant.

3.3. pH Value

Treatment 1 (a), which used 100% leafy vegetable waste, began with a pH of 10.11 on Day 0. Throughout the research, the pH gradually decreased. On Day 4, it was 9.46. On Day 8, it dropped further to 9.16. By Day 12, the pH had reached 8.7. On Day 16, it remained relatively stable at 8.69. The pH continued to decrease slightly, reaching 8.67 on Day 20. Finally, on Day 24, the pH reached its lowest point at 8.66. Next for Treatment 2 (b), a combination of leafy vegetable waste and chicken manure, started with a pH of 8.68 on Day 0. As time passed, the pH consistently decreased. On Day 4, the pH was 8.57. On Day 8, it dropped to 8.46. On Day 12, it decreased further to 8.44. On Day 16, it was 8.38. Then, there was a significant drop to 7.5 on Day 20; on Day 24, it was 7.47. Treatment 3 (c), which consisted of a mixture of 50% leafy vegetable waste and 50% peat moss, was 7.05 on Day 0. Over the observed period, the pH levels in Treatment 3 gradually decreased. Specifically, the pH levels were recorded as 6.99 on Day 4, 6.91 on Day 8, 6.88 on Day 12, 6.78 on Day 16, 6.65 on Day 20, and 6.45 on Day 24. Lastly, Treatment 4 involves mixing 50% leafy vegetable waste with 50% topsoil. On Day 0, the pH of Treatment 4 was 7.47. Throughout the experiment, the pH slightly decreased to 7.45 on Day 4, 7.38 on Day 8, 7.27 on Day 12, 7.18 on Day 16, 7.16 on Day 20, and finally 7.11 on Day 24, according to Figure 3.

This interaction can yield a resultant compost with a pH leaning towards [23]. The combination of leafy vegetable waste, mature compost, and chicken manure establishes a dynamic interplay between the slightly acidic to neutral pH of chicken manure (ranging from 6.0 to 7.5) and the neutral pH of mature compost. Consequently, the final compost pH is poised to be almost neutral, with the buffering capacity of mature compost and the neutral pH of leafy vegetable waste counterbalancing the slight acidity of chicken manure [24]. Given that topsoil generally maintains a pH within the neutral range of 6.0 to 7.0 and leafy vegetable waste tends to be neutral or slightly acidic, the resulting compost composition is likely to exhibit a pH suitable for various plant species [25]. The combination of leafy vegetable waste and peat moss in composting introduces a balance between the slightly acidic nature of peat moss, typically within a pH range of

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3.5 to 4.5, and the relatively neutral to slightly acidic pH of leafy vegetable waste.

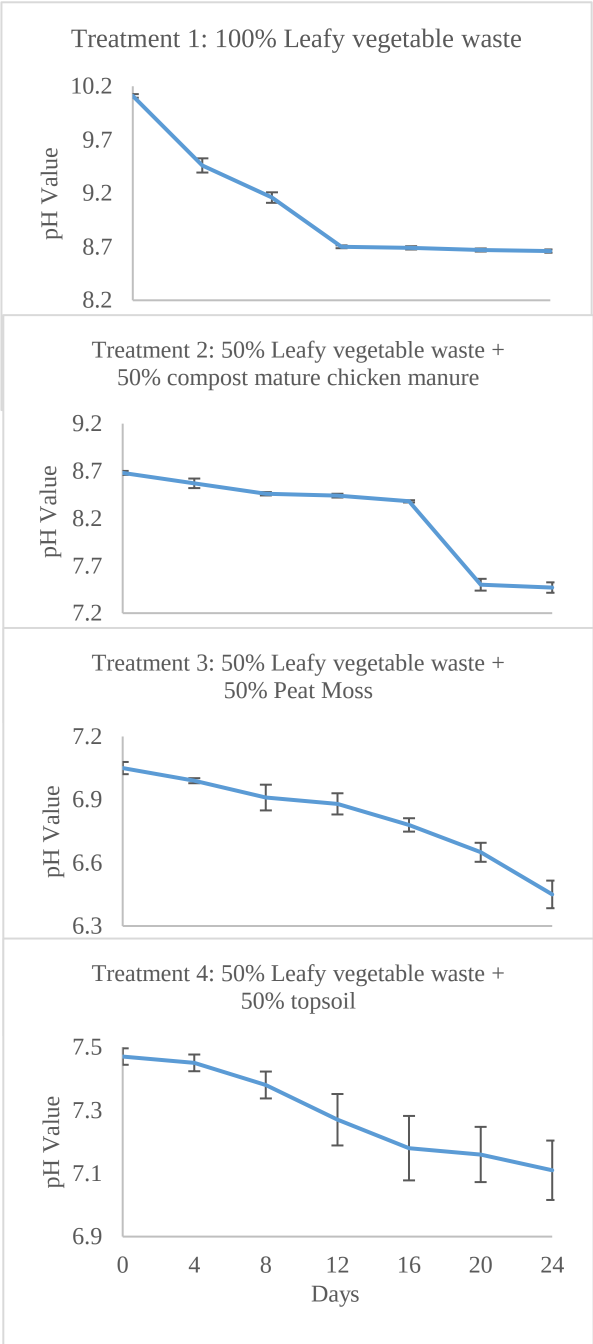

Figure 3. Stage of compost matured of pH

3.4. Electrical Conductivity (EC)

Figure 4, in Treatment 1 (a), which only used 100% leafy vegetable waste, on Day 0, the electrical conductivity (EC) value was 13.507 mS/cm. It slightly decreased to 13.457 mS/cm on Day 4, and then decreased to 11.977 mS/cm on Day 8. On Day 12, the EC value was 11.677 mS/cm; on Day 16, it was 11.620 mS/cm. By Day 20, the EC value further decreased to 11.470 mS/cm; on Day 24, it reached 11.053 mS/cm. Next, Treatment 2 (b), which consisted of a combination of 50% leafy vegetable waste and 50% composted mature chicken manure, initially had a high electrical conductivity (EC) reading of 20.447 mS/cm on Day 0. The data indicates a steady decline in conductivity values over a period. On Day 4, the conductivity was measured at 20.393 mS/cm, which decreased to 18.183 mS/cm on Day 8. A further decrease was observed on Day 12, with a conductivity of 17.757 mS/cm. The trend continued with a reading of 16.670 mS/cm on Day 16 and a further decrease to 15.180 mS/cm on Day 20. Finally, there was a significant drop in conductivity to 12.783 mS/cm by Day 24. Other than that, Treatment 3 (c), which consisted of a mixture of 50% leafy vegetable waste and 50% peat moss, had an initial electrical conductivity (EC) of 5.319 mS/cm on Day 0. Over the course of the experiment, the EC steadily decreased. On Day 4, it was measured at 5.309 mS/cm. By Day 8, it had dropped further to 5.165 mS/cm. On Day 12, the EC decreased even more to 4.990 mS/cm. The most significant drop occurred on Day 16, when the EC reached 3.985 mS/cm. On Day 20, it was measured at 3.684 mS/cm, and by Day 24, it had decreased to 3.372 mS/cm. Lastly, in Treatment 4 (d), a mixture of 50% leafy vegetable waste and 50% topsoil. On Day 0, the electrical conductivity (EC) was 2.503 mS/cm. Throughout the experiment, the EC slightly decreased to 2.491 mS/cm on Day 4. Then, it decreased further to 2.104 mS/cm on Day 8, 1.907 mS/cm on Day 12, 1.691 mS/cm on Day 16, 1.477 mS/cm on Day 20, and finally reached 1.344 mS/cm on Day 24.

The ultimate EC will be influenced by different factors, such as the proportion of peat moss to vegetable waste and the specific conditions during composting [26]. When leafy vegetable waste

is combined with topsoil, the resulting EC will mainly be influenced by the waste-to-topsoil ratio. The electrical conductivity (EC) of compost resulting from the combination of leafy vegetable waste and peat moss can exhibit variability due to multiple factors. Initially, peat moss has a low EC (<3.0) because it is primarily composed of organic matter with limited salt content. However, as the composting process progresses, the EC may increase due to the breakdown of organic matter, which releases soluble nutrients and salts. Implementing proper compost management techniques, including maintaining adequate aeration and moisture levels, can help reduce the potential for elevated EC levels.

3.5. C/N Ratio

The Table 1 results show the carbon-to-nitrogen (C/N) ratio for different media, with the highest value observed in Treatment 4 (d), (50% leafy vegetable waste + 50% topsoil), recording a C/N ratio of 39.53. This was followed by Treatment 3 (c), (50% leafy vegetable waste + 50% peat moss) at 21.99. Next is Treatment 2 (b), (50% leafy vegetable waste + 50% composted matured chicken manure) at 12.01, and the lowest value was found in Treatment 1 (a), (100% leafy vegetable waste) at 11.28. The reason for this is that topsoil provides fewer organic nutrients to the compost blend [27

Table 1 C/N ratio compost matured (%)

Treatment	C/N Ratio (%)
Treatment 1: 100% leafy vegetables waste	11.28[c]
Treatment 2: 50% Leafy vegetable waste with 50% matured compost chicken manure	12.01[c]
Treatment 3: 50% Leafy vegetables waste with 50% peatmoss	21.99[b]
Treatment 4: 50% leafy vegetables waste with 50% topsoil	39.53[a]

3.6 Sowing

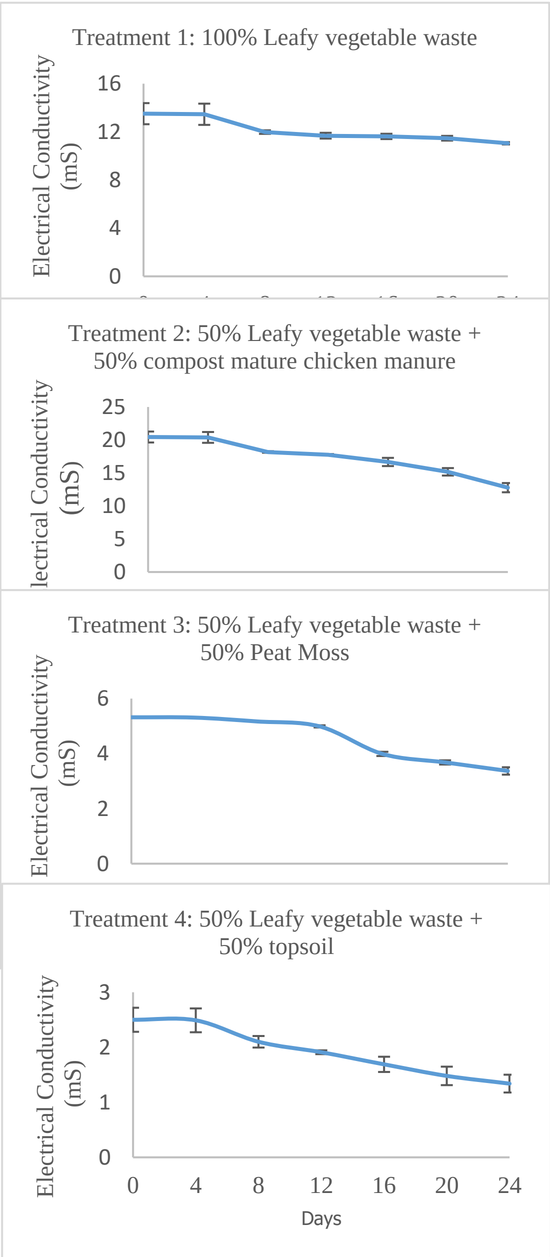

Figure 4. Stage of compost matured of EC

Figure 5 shows mature planting media for treatment1,2,3, and 4. According to Table 2, the Control which used 100% Peat moss, showed a 100% growth percentage and seedling reached a height of 5.4 cm. Next, Treatment 2, which consisted of a 50% mix of leafy vegetable waste with composted mature chicken manure, exhibited a significantly lower growth percentage of just 10%, and the seedling height was only 1.3 cm. Treatment 3, a combination of 50% leafy vegetable waste with peat moss, achieved a 100% growth percentage, with seedling growing to a height of 6.7 cm, which was the tallest among all treatments. Lastly Treatment 4, which combined 50% leafy vegetable waste with topsoil, also showed a 100% growth percentage, and the plants reached a height of 6.0 cm. Figure 6 shown activity sowing mustard for 7 days using production planting media.

Interestingly, Treatments 3 and 4, combining leafy vegetable waste with either peat moss or topsoil, respectively, achieved 100% growth percentages and heights of 13.5 cm and 12.4 cm, underscoring the effectiveness of a balanced mix of organic waste and either peat moss or topsoil in providing a nutrient-rich, well-structured soil that supports plant growth. This data aligns with current research emphasizing the importance of balanced soil composition for optimal plant growth. The data suggests that a balance of moisture retention, aeration, and nutrient supply is key to optimal plant growth. While 100% peat moss is effective, combinations involving leafy vegetable waste and either peat moss or topsoil can also create conducive growth environments. This supports the idea that sustainable gardening practices, incorporating organic waste materials, can be highly effective [28].

3.7 Cost

The cost of planting media for among treatments is in Table 2. Treatment 1 involved the use of 100% leafy vegetable waste, with no additional cost incurred. Treatment 2 combined 50% leafy vegetable waste with 50% matured compost chicken manure, costing RM5.00 per unit. Treatment 3 utilized 50% leafy vegetable waste with 50% peat moss, costing RM9.00 per unit. Lastly, Treatment 4 consisted of 50% leafy vegetable waste mixed with 50% topsoil, costing RM5.00 per unit.

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Table 2 Cost of planting media for among treatment

Material	**Unit**	**Price per unit**	**Total**
Treatment 1: Control Peatmoss (media sowing)	1kg	RM9.00	RM9.00
Treatment 1: 100% leafy vegetables waste	1kg	RM0	RM0
Treatment 2: 50% Leafy vegetable waste with 50% matured compost chicken manure	1kg	RM5.00	RM5.00
Treatment 3: 50% Leafy vegetables waste with 50% peatmoss	1kg	RM9.00	RM9.00
Treatment 4: 50% leafy vegetables waste with 50% topsoil	1kg	RM5.00	RM5.00

Table 3 Effect of different Planting Media on percentage growth (%) and plant height (cm) on mustard

Treatment		**Percentage Growth (%)**	**Plant Height (cm)**
Treatment 1:	Control (Peat moss)	100%	5.4[c]
Treatment 2:	50% leafy vegetable waste with composted mature chicken manure	10%	1.3[c]
Treatment 3:	50% leafy vegetable waste with peat moss	100%	6.7[a]
Treatment 4:	50% leafy vegetable waste with topsoil	100%	6.0[b]

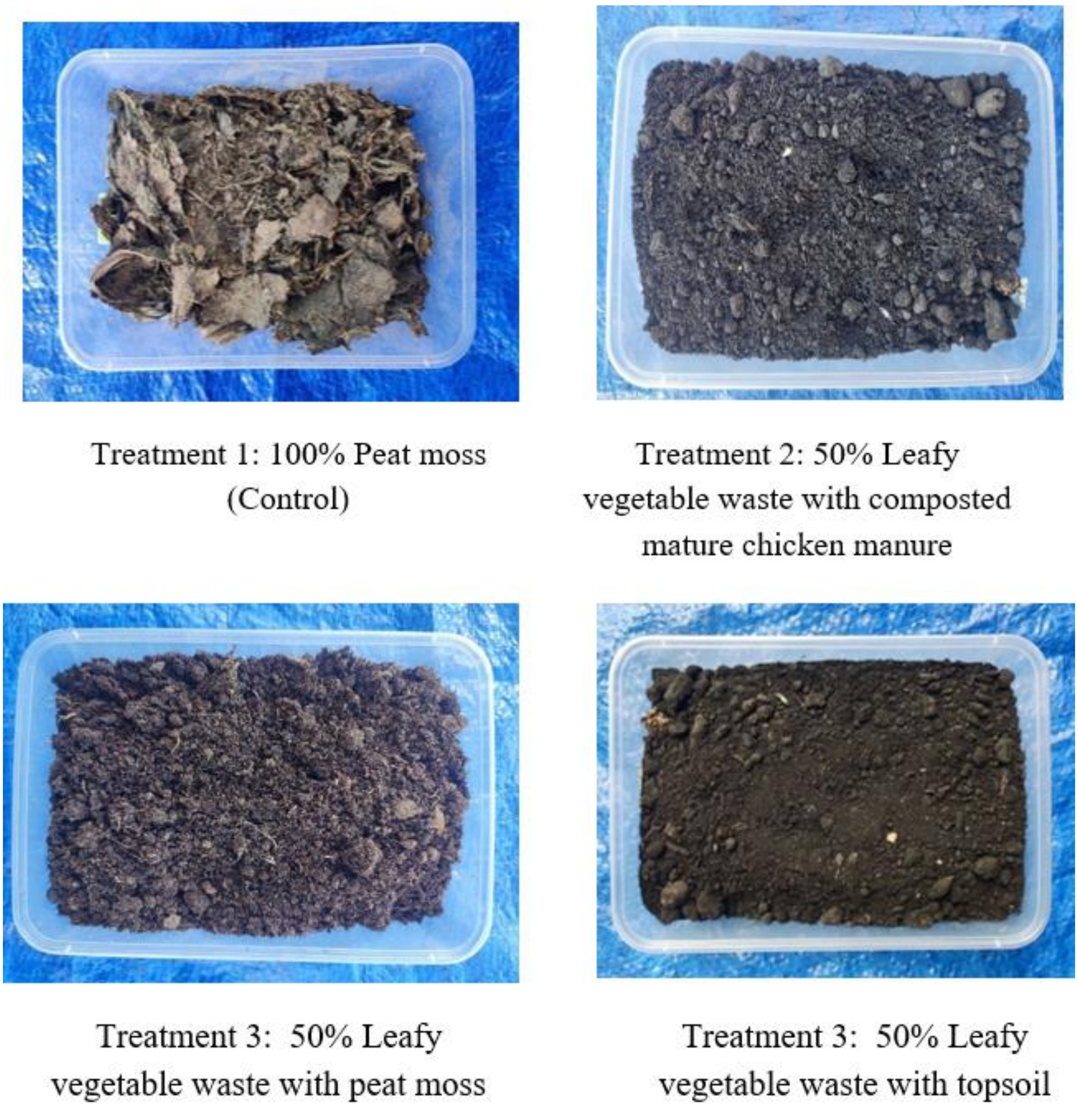

Figure 5. The planting media mature

Figure 6 The activity of sowing mustard for 7 days using production planting media from leafy vegetable waste to determine the effect of different planting media on plant growth for stage sowing. Treatment 1 (brown): 100 leafy vegetables waste, Treatment 2 (white): 50% leafy vegetables waste + 50% chicken manure, Treatment 3 (yellow): 50% leafy vegetables waste + 50% peat moss, Treatment 4 (pink): 50% leafy vegetables waste + 50% topsoil.

4. Conclusion

The study conducted on the creation of planting media using vegetable waste found that different treatments had different effects on various factors such as temperature stability, moisture content, pH, EC, C/N ratio, plant growth, and cost. The experiment involving the treatment using 100% leafy vegetable waste successfully reached temperature equilibrium, indicating that the composting process was efficient. The combinations of leafy vegetable waste with either peat moss or topsoil were found to be effective, as they achieved temperature stability within a week. On the other hand, it was observed that the combination involving chicken manure required more time, indicating a slower composting process because of its elevated nitrogen content. The moisture content differed among the treatments, and each treatment needed specific management to ensure successful composting. According to the study, it was observed that the pH levels in all treatments were mostly close to neutral. This is considered advantageous for the growth of most plants. The electrical conductivity and C/N ratio varied based on the materials utilized, thereby impacting the compost's overall quality. When it comes to plant growth, the mixtures containing peat moss or topsoil produced the most favorable outcomes. Based on the cost analysis, it was determined that utilizing 100% leafy vegetable waste is the most cost-effective option. Important finding different treatments provided distinct in terms of nutrient content and seedling

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