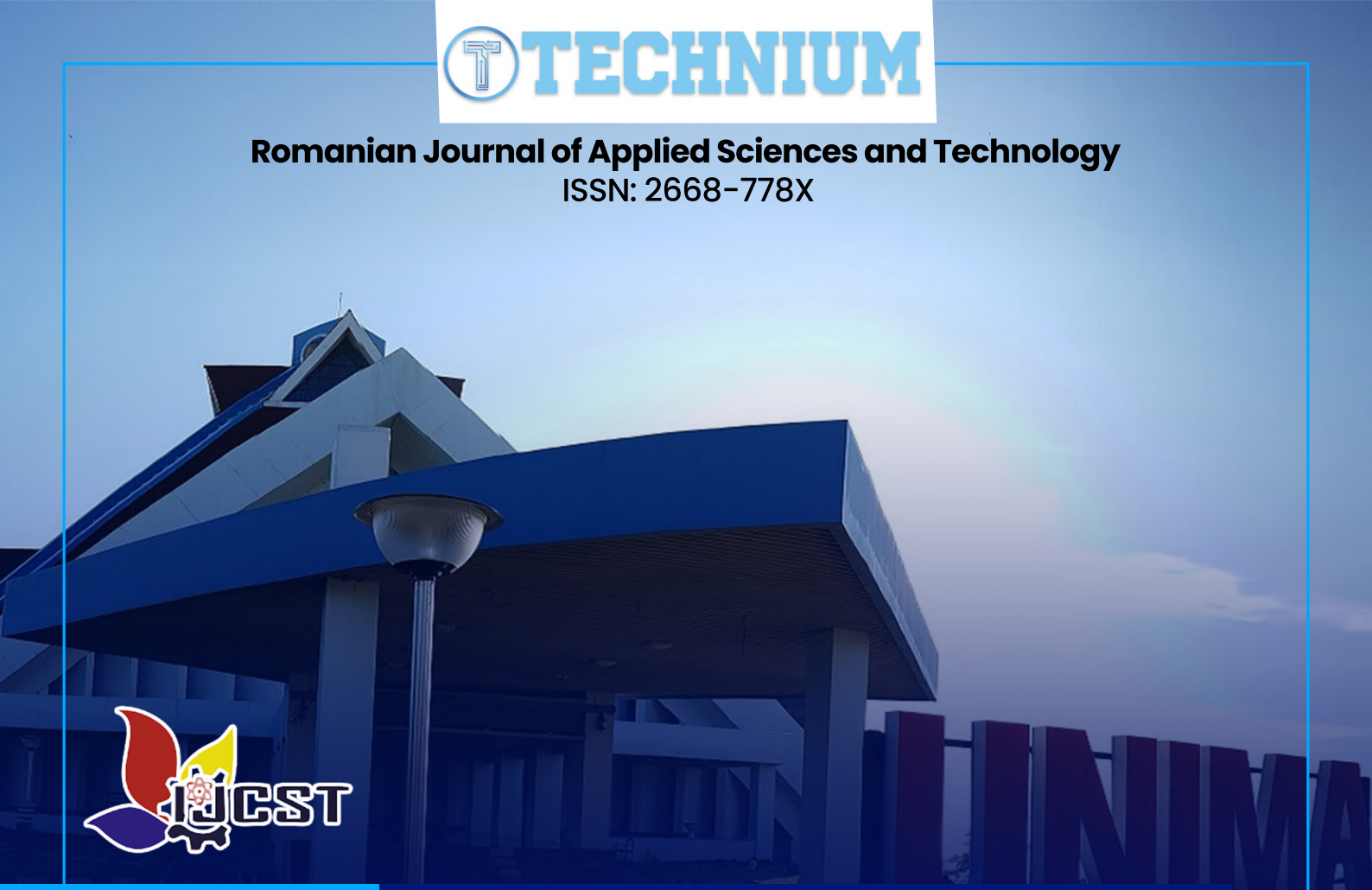
TECHNIUM

Romanian Journal of Applied Sciences and Technology
ISSN: 2668-778X



vol. 17 / 2023

The 7th International Conference on Science Technology

organized by
Faculty of Social Science and
Law Universitas Negeri Manado and
Consortium of International Conference
on Science and Technology

The Innovation Breakthrough in Digital and Disruptive Era

PLUS COMMUNICATION

International Communication & PR

Technium: Romanian Journal of
Applied Sciences and Technology
Vol. 17, 75-81, November, 2023
ISSN: 2668-778X
www.techniumscience.com

Application of Cow Compost and Sago from Charcoal on The Growth of Sawy (Brassica juncea L.)

Diana Susanti[1*], *Nemo* Alexia A[2], *Resubun* Mariana L[1], *Rangga Kusumah*[1], and Nurhaya J. Panga[1]

[1]Department of Agrotechnology, Universitas Musamus, Merauke, 99611, Indonesia
[2]Government Agriculture Service, District Mappi, Mappi, 99871, Indonesia

Abstract. This study aims to examine the effect of the combined treatment of sago midrib charcoal planting media with different dose levels of cowshed compost on the growth of mustard plants. The study was conducted in Mandala Village, Merauke Regency from February 2022 to March 2022 using a factorial Randomized Block Design with 12 treatment combinations and 4 replicates, namely: A1B1 (soil without cow manure compost), A1B2 (soil + 5 tons of cow manure compost/ ha) A1B3 (soil + cowshed compost 10 tons/ha), A1B4 (soil + cowshed compost 15 tons/ha), A2B1 (soil + sago midrib charcoal without cowshed compost), A2B2 (soil + sago charcoal + compost cowshed 5 tons/ha), A2B3 (soil + charcoal from sago fronds + compost from cowshed 10 tons/ha), A2B4 (soil + charcoal from sago leaves + compost from cowshed 15 tons; ha), A3B1 (sago midrib charcoal without compost cattle), A3B2 (charcoal + 5 ton/ha cowshed compost), A3B3 (sago frond charcoal + 10 ton/ha cowshed compost), A3B4 (sago frond charcoal + 15 ton/ha cowshed compost). The results showed that the combination of the treatment of planting media and cowshed compost had a significant and very significant effect on the A1B4 treatment (soil medium + 15 ton/ha cowshed compost dose) on parameters of plant height (39.75 cm), leaf length at 40 Hst (226.25 mm) and total harvested weight (72 grams). Furthermore, the A2B3 treatment combination (soil medium + sago frond charcoal + 10 tons/ha cowshed compost) showed significantly different yields on the number of leaves parameter (9.75) and the A2B4 treatment (soil medium + sago palm charcoal + 15 cowshed compost) ton/ha) on leaf width parameter (122.75 mm).

Keyword: Mustard plants, combination, growing media, cow stall compost

* Corresponding author: diana@unmus.ac.id

TECHNIUM

Technium: Romanian Journal of
Applied Sciences and Technology
Vol. 17, 75-81, November, 2023
ISSN: 2668-778X
www.techniumscience.com

1 Introduction

Vegetables are one of the agricultural products that have good prospects because they are needed every day and also have high economic value. Mustard greens (Brassica Juncea L), are a type of vegetable that is often found and easy to obtain both in fresh and processed form. Because the demand for mustard greens is always increasing, efforts are needed to meet consumer needs both in terms of quality and quantity. This can be seen from the production of mustard greens in Merauke Regency in 2020 of 5,369.40 tons/ha with a vegetable harvest area of 31.40 ha, (Source: Food Crops, Horticulture and Plantation Office of Meraauke Regency). One way to increase the quality and quantity of mustard greens production is through the use of good growing media.

Hadisuwitto (2015) stated that the planting medium is a place for roots to attach, as well as a provider of nutrients for plants. In addition, the media is the main component that needs to be considered early on in the process of cultivation techniques. Sago fronds have been used by the community as a building material (as the walls of houses) and are considered waste because these sago fronds are usually left alone and stacked under sago trees. Sago fronds can be used as a growing medium through the carbonization process. Carbonization is an incomplete combustion process of organic materials with a limited amount of oxygen (Masturin, 2002). Charcoal planting media is used because it can improve soil conditions, is able to increase the development of soil microorganisms, can increase the soil's ability to hold water or maintain soil moisture, Gusmaillina et al. (2001).

Efforts to increase the quality and quantity of mustard greens production Apart from paying attention to the planting media, also pay attention to the nutritional needs of these plants. One way is by applying organic fertilizer in the form of cow manure compost. Cow pen compost contains macro and micronutrients that are useful for plants. Novitasari and Caroline (2021) state that the nutrient content of cow dung includes: 0.4-1% Nitrogen, 0.2-0.5% Phosphorus, 0.1-1.5% Potassium, and several other nutrients (Ca, Mn, Mg, Fe, Cu, Zn) with a moisture content of 85-95%. In addition, cow dung compost also provides benefits to the soil, namely making the soil loose, improving soil texture and structure, and increasing porosity, aeration, and soil microorganism components (Hartatik et al, 2015).

Based on the description above, it is necessary to study the effect of using sago midrib charcoal as a planting medium and using cowshed compost on the growth of mustard plants.

2 Material and Metodhs

This research was conducted on Jalan Brawijaya RT.8 RW II Mandala Village, Merauke District, Merauke Regency from February 2022 to March 2022. The tools used in the study were polybags measuring 15 cm x 30 cm with a diameter of 15 cm, gembor, hoe, rulers, scales, tarpaulins, and trays (seedling containers). The materials used were cow manure, sago root charcoal, EM4, rice washing water, brown sugar, and Shinta variety mustard seed (Brassica juncea L). This study used the experimental method with a factorial Randomized Block Design (RBD) consisting of 12 treatment combinations to obtain 48 experimental unit samples. The treatments given (A) were: A1B1: (soil medium without fertilizer dose), A1B2: (soil medium + cow manure compost dose 355 gr/polybag). A1B3 : (soil medium + dose of cow manure compost 775 gr/polybag). A1B4 : (soil medium + cow manure compost dosage 1065 gr/polybag). A2B1 : (ground charcoal medium without cowshed compost). A2B2 : (ground charcoal medium + 335 gr/polybag cow manure compost). A2B3 : (ground charcoal media + 775 gr/polybag cow manure compost). A2B4 : (ground charcoal media + 1065 gr/polybag cow manure compost). A3B1 : (charcoal medium without cowshed compost). A3B2 : (charcoal medium + cow manure compost dose 335 gr/polybag). A3B3 : (charcoal medium + cow manure compost dose 775 gr/polybag). A3B4 : (charcoal medium + 1065 gr/polybag cow manure compost). The parameters measured from the plants were: plant height (cm), number of leaves (strands), leaf width (cm), leaf length (cm), and total harvest weight (gr).

3 Results and Discussion

Observational data was carried out to determine the effect of different treatments of soil planting media, sago frond charcoal, and cowshed compost on the growth of mustard plants (brassica juncea L). Parameters observed in the growth of mustard plants include plant height, number of leaves, leaf width, leaf length, and total harvest weight. The results of data analysis for each parameter are presented as follows:

3.1 Mustard Plant Height (Brassica juncea L) During Growth Period

Based on the results of the analysis of variance and the BNT test and table (2) it shows that the treatment had a significant effect on the number of leaves aged 10 and 40 HST and the effect was very, very significant at the ages of 20 and 30 HST. At the age of 10 DAP the highest number of leaves was shown in treatments A1B3 (3), A1B1 (2.75), A1B4 (2.75) which had a very significant effect on treatment A2B2 (2.5) which was not different from treatments A2B3 (2.5), A2B4 (2.5). In different treatments and giving the same effect was seen in treatments A2B1 (2.25), A3B3 (2.25) but significantly different in treatments A1B2 (2), A3B1 (2), A3B2 (2), A3B4 (2). At the age of 20 HST the highest average number of leaves was obtained in treatment A1B3 (5) which was not significantly different from treatment A1B4 (5) and the lowest average was found in treatment A2B1 3.5 which was not significantly different from treatment A3B1 (2.75). In different treatments but giving the same

TECHNIUM
Technium: Romanian Journal of Applied Sciences and Technology
Vol. 17, 75-81, November, 2023
ISSN: 2668-778X
www.techniumscience.com

effect seen in treatment A2B2 (4.5) A3B3 (4.5) but significantly different in treatment A3B3 (4.25).

Table 1. Average Height of Mustard Plants (Brassica juncea L)

Perlakuan	Tinggi Tanaman			
	10 HST	20 HST	30 HST	40 HST
A1B1	**5.88 cd**	10 ab	15.75 b	26 bc
A1B2	5 c	11 b	19.75 c	32.25 c
A1B3	6 d	**12.25 cd**	26.25 e	35.75 d
A1B4	**5.75 c**	**13.25 d**	**26.5 e**	**39.75 e**
A2B1	5.25 c	11 b	14.5 b	25.50 b
A2B2	5.25 c	11.75 bc	21.25 d	32.50 c
A2B3	5.5 c	11 b	23.75 d	35.75 d
A2B4	5.5 c	8.75 a	22.5 d	35.50 d
A3B1	3.75 a	9.25 a	11 a	17.25 a
A3B2	4.0 a	8.75 a	15.25 b	24.75 b
A3B3	4.5 bc	10.5 b	18.75 c	32.75 cd
A3B4	4.25 ab	9.25 a	18.5 c	32.25 c
Rata-Rata	5.05	10.56	19.438	30.833
F.Tabel 5%	2.09	2.09	2.09	2.09
F.Hitung	3.43*	3.950*	16.229**	14.71**
BNT 0.05	0.59	1.03	1.72	2.35

Keteranggan : Angka yang diikuti huruf yang sama tidak berbeda nyata berdasarkan sidik ragam 5%, (ns) non signifikan Sumber : Hasil Olah Data Primer 2022.

The combination of treatments A1B1 (4) did not differ from the treatments A1B2 (4), A3B2 and A3B4 which were very significantly different from the treatments A2B1 (3.5) and A3B1 (2.75). At 30 HST the highest number of leaves was found in treatment A1B4 (10) and the average leaf the lowest was shown in treatment A1B1 (6) which did not differ from treatment A2B1 (6.25), A3B1 (6), A3B2 (6). In the combination of treatments A1B2 (7.5), it was not different from the treatments A1B3 (7.5), A2B2 (7), A2B4 (8), A3B3 (8), A3B4 (8). In the 40 DAP observation, the highest number of leaves was shown in treatment A2B3 (9.75), which was not significantly different in treatments A3B3 (9.25), A1B4 (9), but significantly different in treatment A1B3 (8.75). The A1B2 treatment (7.5) did not differ from the A2B4 (8), A2B2 (8.25), A3B4 (8) treatments but was significantly different from the A2B1 treatment (6.75).

Table 2 explains that the growth in the number of leaves for each treatment had a real and very significant effect on each treatment on each week of observation. The average plant height for each treatment given at each observation time was different. However, the A2B3 treatment showed an increase in the number of leaves at each observation time. The high mean number of leaves in the A2B3 treatment 10 HST (2.5), 20 HST (4.5), 30 HST (8.5), and 40 HST (9.75) This is presumably due to the composition of the planting medium with the combination of treatments at different dose levels of cow manure compost gives a good response to the number of leaves because the nutrients contained in manure are able to meet the needs of nitrogen nutrients in plants so as to increase the number of leaves for plants. This is reinforced by the opinion (Sari et al., 2016) that the element nitrogen which is available in sufficient quantities can increase the number of leaves and the rate of plant photosynthesis so that the leaves can produce photosynthates and higher energy for growth and production.

3.2 Number of Leaves During Growth Period

Measurement of the growth of the number of leaves of the mustard plant was carried out when the mustard was 10 days old, 20 days, 30 days, and 40 days after planting.

Based on the results of the analysis of variance and the BNT and table (2) it shows that the treatment had a significant effect on the number of leaves aged 10 and 40 HST and the effect was very, very significant at the ages of 20 and 30 HST. At the age of 10 DAP the highest number of leaves was shown in treatments A1B3 (3), A1B1 (2.75), A1B4 (2.75) which had a very significant effect on treatment A2B2 (2.5) which was not different from treatments A2B3 (2.5), A2B4 (2.5). In different treatments and giving the same effect was seen in treatments A2B1 (2.25), A3B3 (2.25) but significantly different in treatments A1B2 (2), A3B1 (2), A3B2 (2), A3B4 (2). At the age of 20 HST the highest average number of leaves was obtained in treatment A1B3 (5) which was not significantly different from treatment A1B4 (5) and the lowest average was found in treatment A2B1 3.5 which was not significantly different from treatment A3B1 (2.75). In different treatments but giving the same effect seen in treatment A2B2 (4.5) A3B3 (4.5) but significantly different in treatment A3B3 (4.25).

The combination of treatments A1B1 (4) did not differ from the treatments A1B2 (4), A3B2 and A3B4 which were very significantly different from the treatments A2B1 (3.5) and A3B1 (2.75). At 30 HST the highest number of leaves was found in treatment A1B4 (10) and the average leaf the lowest was shown in treatment A1B1 (6) which did not differ from treatment A2B1 (6.25), A3B1 (6), A3B2 (6). In the combination of treatments A1B2 (7.5), it was not different from the treatments A1B3 (7.5), A2B2 (7), A2B4 (8), A3B3 (8), A3B4 (8). In the 40 DAP observation, the highest number of leaves was shown in treatment A2B3 (9.75), which was not significantly different in treatments A3B3 (9.25), A1B4 (9), but significantly different in treatment A1B3 (8.75). The A1B2 treatment (7.5) did not differ from the A2B4 (8), A2B2 (8.25), A3B4 (8) treatments but was significantly different from the A2B1 treatment (6.75).

Table 2 explains that the growth in the number of leaves for each treatment had a real and very significant effect on each treatment on each week of observation. The average plant height for each

TECHNIUM

Technium: Romanian Journal of Applied Sciences and Technology
Vol. 17, 75-81, November, 2023
ISSN: 2668-778X
www.techniumscience.com

treatment given at each observation time was different. However, the A2B3 treatment showed an increase in the number of leaves at each observation time. The high mean number of leaves in the A2B3 treatment 10 HST (2.5), 20 HST (4.5), 30 HST (8.5), and 40 HST (9.75) This is presumably due to the composition of the planting medium with the combination of treatments at different dose levels of cow manure compost gives a good response to the number of leaves because the nutrients contained in manure are able to meet the needs of nitrogen nutrients in plants so as to increase the number of leaves for plants. This is reinforced by the opinion (Sari et al., 2016) that the element nitrogen which is available in sufficient quantities can increase the number of leaves and the rate of plant photosynthesis so that the leaves can produce photosynthates and higher energy for growth and production.

Table 2. Average Number of Leaves Each Observation Time

Perlakuan	Jumlah Daun (helai)			
	10 HST	20 HST	30 HST	40 HST
A1B1	**2.75 c**	4 b	6 a	6.5 a
A1B2	2 a	4 b	7.5. b	7.5 b
A1B3	**3 c**	**5 d**	7.5 b	8.75 bc
A1B4	**2.75 c**	**5 d**	**10 c**	**9 c**
A2B1	2.25 ab	3.5 a	6.25 a	6.75 ab
A2B2	2.5 bc	4.5 c	7 b	8.25 b
A2B3	**2.5 bc**	**4.5 c**	**8.5 b**	**9.75 c**
A2B4	2.5 bc	4.75 cd	8 b	8 b
A3B1	2 a	2.75 a	6 a	6.25 a
A3B2	2 a	4 b	6 a	7 ab
A3B3	2.25 ab	4.25 bc	8 b	**9.25 c**
A3B4	2 a	4 b	8 b	8 b
Rata-Rata	2.38	4.19	7.40	7.92
F.Tabel 5%	2.09	2.09	2.09	2.09
F.Hitung	3.10*	9.82**	9.93**	3.67*
BNT.	0.28	0.29	0.56	0.85

3.3 Leaf Width After Harvest

The measurement of mustard leaf width is carried out at harvest, namely 45 HSP. The data obtained can be seen in the following table:

The results of the analysis of variance with the BNT and Table 3. It shows that the highest leaf width was found in treatment A2B4 (sago midrib charcoal media + soil + 15 ton/ha cow compost dose) of 122.7 which was not significantly different from treatment A1B4 (118.5). The lowest average leaf width was found in treatment A3B1 (49.5). The A1B3 treatment (101.5) had no effect on the A2B3 treatment (105.75), A2B2 (109.75), A3B4 (110.5) but had a significant effect on the A1B2 treatment (95.5). In different treatment combinations and giving the same effect seen in treatment A2B1 (79), A1B1 (81), A3B2 (83.5) but a very significant effect on treatment A3B3 (87.75).

Table 3. Observation Data on Average Width of Mustard Leaves After Harvesting

Perlakuan	Lebar Daun (cm)
A1B1	81 b
A1B2	95.5 cd
A1B3	101.5 d
A1B4	118.5 de
A2B1	79 b
A2B2	109.75 d
A2B3	105.75 d
A2B4	**122.75 e**
A3B1	49.5 a
A3B2	83.5 b
A3B3	87.75 bc
A3B4	110.5 d
Rata-Rata	95.42
F.Tabel 5%	2.09
F.Hitung	11.58
BNT 0.05%	8.67

Keterangan : Angka yang diikuti huruf yang sama sesuai dengan uji BNT 5% berbeda nyata pada perlakuan media tanam A1 (tanah), A2 (arang pelepah sagu + tanah), A3 (arang pelepah sagu).

Table 3 explains that the best planting media treatment with the highest average leaf width was shown in the A2B4 treatment (planting medium of sago palm charcoal + soil + 15 ton/ha cow compost dose) of 122.75. This is presumably because the combination of the composition of the planting media with organic matter in the form of cowshed compost provides more nutrition so that it can help the growth of mustard plants. The best optimum dose is 15 tons/ha because it can increase leaf area. The higher the dose of fertilizer given, the larger the leaf size obtained. According to Sari et al (2016) increasing leaf width allows for an increase in leaf area and the ability of leaves to absorb sunlight in the process of photosynthesis will be better. Sumini et al (2022) added that applying cow manure produces the best leaf width or leaf area and is the same as goat, horse, and chicken manure.

Giving a mixture of planting media from charcoal, sago fronds, and soil can give the highest yield on the width of the leaves of the mustard plant, this is presumably because the planting medium in the form of charcoal is a soil enhancer that can be applied to the soil to help plant growth by improving the chemical and physical properties of the soil, such as soil density. , soil porosity, soil temperature, and soil fertility. Materials commonly used as ameliorants include compost, charcoal, and activated charcoal. (Siruru et al., 2018). The results of the research by Lendi, Antonius, and Agnes (2018) showed that the best combination treatment was 25 tonnes/ha of biochar husk charcoal with 15 tonnes/ha of cow dung manure.

The treatment significantly affected the increase in plant height, increase in the number of leaves, the number of productive branches, the number of fruits per plant, and fruit weight per plant in tomato plants (Licopersicum Escculentum Mill).

3.4 Leaf Length After Harvest

Observation of leaf length was carried out at harvest, namely 45 HSP (days after harvest). The observed data on the average leaf length can be seen in the following table:

Table 4. Data on the Average Length of Mustard Leaves After Harvesting

Perlakuan	Panjang Daun (cm)
	45 $_{HSP}$
A1B1	126.25 mm b
A1B2	195.75 mm de
A1B3	163.75 mm c
A1B4	**226.25 mm e**
A2B1	123.75 mm ab
A2B2	189 mm d
A2B3	191.25 mm d
A2B4	**209.5 mm e**
A3B1	106.75 mm a
A3B2	141.25 mm bc
A3B3	148.5 mm c
A3B4	186 mm d
Rata-Rata	163.33 mm
F.Tabel 5%	0.05
F.Hitung	10.144 **
BNT 0.05%	17.06

Keterangan : Angka yang diikuti dengan huruf yang tidak sama dengan uji BNT 5% berbeda nyata pada perlakuan media tanam.

Based on the results of the analysis of variance and the 5% BNT and Table 4, the highest leaf length was found in treatment A1B4 (soil medium + 15 ton/ha cow compost dose) of 226.25 mm, no different from treatment A2B4 (sago midrib charcoal media). + cow compost dose of 15 tons/ha) which is 209.5 mm Furthermore, the lowest average leaf length is shown in treatment A3B1 (106.75 cm). The A3B4 treatment ((186 cm) did not differ from the A2B3 treatment (191.25). The A3B3 treatment (148.5) had no effect on the A1B3 treatment (163.75) but had a significant effect on the A3B2 treatment (141.25).

Table 4 shows that each treatment in this study had a very significantly different effect on the length of mustard leaves. The highest average leaf width was shown in treatments A1B4 (226.25) and A2B4 (209.5). This is presumably because mustard plants have a good response to loose and porous media combined with cowshed compost where in the use of planting media a sieving process is first carried out so that a loose texture of planting media is obtained and can make it easier for plant roots to absorb nutrients more optimally. This is reinforced by the opinion of Binardi (2014) that loose soil structure makes roots absorb nutrients increase. Manure is the main source of organic matter which can improve the physical, chemical, and biological properties of soil, and also charcoal which has crumb properties and easily absorbs water making it easier for plant roots to absorb nutrients more optimally. This is what allows the soil mixed with charcoal and cowshed compost to give better growth results in terms of leaf length per polybag compared to other treatments which are significantly different. The results of Gustia's research (2013) showed that the addition of rice husk charcoal to the planting medium increased garden height, number of leaves, leaf length, leaf width, wet weight, and consumption weight of mustard plants.

3.5 Total Harvest Weight

Table 5. Observation Data of Total Weight of Mustard Harvest After Harvesting

Perlakuan	Bobot Total Panen (gr)
	45 HSP
A1B1	17.25 gr b
A1B2	34.75 gr c
A1B3	57 gr e
A1B4	**72 gr f**
A2B1	17.25 gr b
A2B2	48 gr d
A2B3	59.75 gr e
A2B4	60 gr e
A3B1	6.5 gr a
A3B2	18.75 gr b
A3B3	49.25 gr d
A3B4	42.75 gr d
Rata-Rata	40.27 gr
F.Tabel 5%	2.09
F.Hitung	7.045 **
BNT 0.05%	17.06

Keterangan : Angka yang diikuti huruf yang sama sesuai uji BNT 5% tidak berbeda nyata pada setiap perlakuan.

The total weight of the mustard harvest after harvest. The observed data can be seen in the following table:

The results of the 5% LSD test on the total weight of the mustard plant showed that all treatments had a very significantly different effect where the highest average total harvest weight was found in treatment A1B4 (soil medium + 15 tons/ha of cow manure compost), namely 72 gr which differed significantly from other treatments. While the lowest average was found in treatment A3B1 (sago midrib charcoal media

without a dose of cowshed compost) of 6.5. The A1B3 treatment (57 gr) was no different from the A2B3 treatment (59.75 gr), A2B4 (60 gr).

The combination of A3B4 treatments had the same effect on treatments A2B2 (48 gr), A3B3 (49.25 gr). treatment A1B2 (34.75 gr) had a significantly different effect on treatment A1B1 (17.25 gr) which was no different in treatment A2B1 (17.25 gr), A3B2 (18.75 gr)

Table 5 explains that the combination of planting media treatment with different doses of cow manure compost for total harvest weight is best shown in treatment A1B4 (soil media + manure dose of 15 tons/ha). This is presumably due to the combination of soil media treatment with cow manure compost. can meet the nutrient needs of mustard plants. Manure contains the nutrients N, P, K which are needed by plants from the vegetative to generative stages. Element N is used as the main ingredient for the formation of chlorophyll and protein, element P as a source of energy, and element K as a material for forming carbohydrates (Purba et al., 2015). Imelda et al (2019) added that cow manure compost has advantages over other artificial fertilizers, namely organic matter in the soil which occurs due to the process of breaking down plant and animal remains as a source of essential nutrients for plant growth and development, increasing the soil's ability to hold water and contains micro-organisms that synthesize certain compounds that are useful for plants.

4 Conclusion

Based on the results of the research that has been carried out, it can be concluded as follows:

The combination of planting media and cowshed compost treatment had a significant and very significant effect on the A1B4 treatment (soil medium + cowshed compost dose of 15 tons/ha) on the parameters of plant height (39.75 cm), leaf length (226.25 mm) and the total weight of the harvest (72 grams) was then in the A2B3 treatment combination (soil medium + sago midrib charcoal + 10 tons/ha cowshed compost) for the number of leaves parameter (9.75) and in the A2B4 treatment (soil medium + sago midrib charcoal + cowshed compost 15 ton/ha) on leaf width parameter (122.75 mm). Based on the results of this study, further research is needed regarding the use of sago midrib charcoal and its interaction with cowshed compost and various types of compost at different dose levels on plant growthObservational data was carried out to determine the effect of different treatments of soil planting media, sago frond charcoal, and cowshed compost on the growth of mustard plants (brassica juncea L). Parameters observed in the growth of mustard plants include plant height, number of leaves, leaf width, leaf length, and total harvest weight. The results of data analysis for each parameter are presented as follows:

References

[1] Akbar, Helmi Dzikrulloh; Aini, Nurul; Herlina, Ninuk. Pengaruh Dosis Pupuk Kascing Dan Jarak Tanam Yang Berbeda Terhadap Pertumbuhan Dan Hasil Tanaman Kailan (Brassica oleraceae L. var alboglabra). Jurnal Produksi Tanaman, 2018, 6.6.

[2] AZIZAH, Nur. Pengaruh Pemberian Pupuk Kandang Sapi Dan Pupuk NPK Phonska Terhadap Pertumbuhan Dan Produksi Okra (Abelmoschus Esculentus L. Moenc). 2019. PhD Thesis. Universitas Islam Riau.

[3] Binardi, S. (2014). Pengaruh Pengolahan Tanah Dan Pupuk Organik Bokashi Terhadap Pertumbuhan Dan Hasil Tanaman Kedelai (Glycine Max L.). Kultivar Wilis. Edisi Juli, 8(1), 29-46.

[4] Cahyono, B. 2003. Teknik dan Strategi Budidaya Sawi Hijau (Pet-Sai). Yayasan Pustaka Nusantara.Yogyakarta. Hal 117.

[5] Damayanti, N. S., Widjajanto, D. W., & Sutarno, S. (2019). Pertumbuhan dan produksi tanaman sawi Pakcoy (Brassica rapa l.) akibat dibudidayakan pada berbagai media tanam dan dosis pupuk organik. Journal of Agro Complex, 3(3), 142-150.

[6] Delfiya, M., & Ariska, N. (2022). Pengaruh Kombinasi Media Tanam Terhadap Pertumbuhan dan Hasil Tanaman Sawi (Brassica Juncea L.). COMSERVA: Jurnal Penelitian dan Pengabdian Masyarakat, 1(9), 614-622.

[7] Dinas Tanaman Pangan, Holtikultura dan Perkebunan Kabupaten Merauke, 2020.

[8] Dyanti, Riana. Studi Komparatif Gula Merah Kelapa dan Gula Merah Aren. Skripsi. Jurusan Teknologi Pangan dan Gizi. Fakultas Teknologi Pertanian. IPB. Bogor, 2002.

[9] Gustia, H. 2013. Pengaruh Penambahan sekam Bakar Pada Media Tanam Terhadap Pertumbuhan dan Produksi Tanaman sawi (Brassica juncea L.) . E-Journal WIDYA Kesehatan dan Lingkungan, 1 (1), 12-17

[10] Gole, Imelda Dada, I. Made Sukerta, and Bagus Putu Udiyana. "Pengaruh dosis pupuk kandang sapi terhadap pertumbuhan tanaman sawi (Brassica juncea L.)." Agrimeta: Jurnal Pertanian Berbasis Keseimbangan Ekosistem 9.18 (2019)

[11] Hartatik, Wiwik, Husnain, dan Ladiyani R. Widowati. Peranan Pupuk Organik dalam Peningkatan Produktivitas tanah dan tanaman. Jurnal Sumberdaya Lahan. 9.2 (2015).

[12] Lendi, Y. Y., Ndiwa, A. S., & Simamora, A. V. 2018. Pengaruh Kombinasi Biochar Arang Sekam dan Pupuk Kandang Kotoran Sapi Terhadap Pertumbuhan dan Hasil Tomat (Lycopersicum esculentum Mill). Skripsi

[13] Purba, R.B., Momongan, N. R., & Monolimay, S. (2015). Asupan Karbohidrat dan Lemak Pada Diabetesi Tipe li yang Rawat Jalandi Puskesmas Tombatu. Jurnal Gizido, 7(2), 362-367

Technium: Romanian Journal of Applied Sciences and Technology
Vol. 17, 75-81, November, 2023
ISSN: 2668-778X
www.techniumscience.com

[14] Sari, Beti Purnama, Mudji Santoso, and Koesriharti. Pengaruh Komposisi Media Tanam dan Pupuk Nitrogen Terhadap Pertumbuhan Serta Hasil Tanaman Sawi Pak Choi (Brassica Rapa L Var. Chinensis). Diss. Brawijaya University, 2016.

[15] Siruru, H., Syafii, W., Wistara, N. J., & Pari, G. 2018. Pengaruh Durasi Steam terhadap KualitasAramg Aktif Limbah Sagu. Jurnal Ilmu dan Teknologi Kayu Tropis, 16(2), 115-130