ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 14, Issue, 06, pp.21585-21590, June, 2022
DOI: https://doi.org/10.24941/ijcr.43583.06.2022

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE INFLUENCE OF PLANTING MEDIA AND THE CONCENTRATION OF TOFU LIQUID FERTILIZER ON THE GROWTH OF KALE LAND (*IPOMOEA REPTANS POIR*) HYDROPONICALLY

***Rini Retnowati**

Research and Lecture of Agricultural Sciences Faculty Universidade da Paz, Timor-Leste

ARTICLE INFO

Article History:
Received 25th March, 2022
Received in revised form
19th April, 2022
Accepted 14th May, 2022
Published online 30th June, 2022

Key words:

Kale land, Media, Liquid Fertilizer, Hydroponic Substrate.

****Corresponding Author:***
Rini Retnowati

ABSTRACT

Kale land (*Ipomoea reptana Poir*) is one type of vegetable crop that is short-lived, has economic value, and also has a high nutritional content, namely vitamins A, B, C, protein, calcium, phosphorus, *sitosterol*, and mineral materials, especially iron that is useful for the growth of the body and health. Hydroponics is an alternative technology in the cultivation by using media other than soil and nutrient substrate. One alternative nutrient that can be applied, namely liquid fertilizer derived from the fermentation of waste from the manufacturing process. The purpose of this study is to investigate the influence of planting medium and the concentration of waste liquid manure out of the land kale growing hydroponically. The research was conducted in field trials in Suco Manleuana (Dili) began on 29 April 2018 until May 30, 2018. This study is a field experiment with the design used was a randomized block design pattern group with 2 factors. The first factor is the media's treatment plant consists of three types of growing media: M1: rice husk charcoal, M2: Sand rivers, and M3: Sand river + rice husk. The second factor is the provision of waste liquid fertilizer know which consists of four levels: $P_{0:}$ Provision of waste liquid manure out of 0%, $P_{1:}$ Provision of waste liquid manure out of 10%, $P_{2:}$ Provision of waste liquid manure out of 20%, $P_{3:}$ Provision of waste liquid manure out 30%, and $P_{4:}$ Provision of waste liquid manure out of 40%. Variables to be observed consist of plant height (observations on the first week to the fourth week), the number of leaves (observations on the first week to the fourth week), and the fresh weight of plant kale land (observations on the fourth week). The data obtained will be analyzed for variance and if necessary it will proceed with Duncans Multiple Range Test (DMRT) at the 5% significance level. Based on the results of further tests using Duncan's Multiple Range Test (DMRT) showed significant differences among treatments. Treatment shows the growth and yield of kale best land indicated in the treatment M1P3 (rice husk growing media and the concentration of waste liquid manure out of 30%) with a mean value of 10.83 the number of leaves, plant height 33.85 cm, and a wet weight of 14.33 grams.

Copyright©2022, Rini Retnowati. *This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*

Citation: ***Rini Retnowati.*** **2022.** "The influence of planting media and the concentration of tofu liquid fertilizer on the growth of kale land (*ipomoea reptans poir*) hydroponically". *International Journal of Current Research*, 14, (06), 21585-21590.

INTRODUCTION

Kale land (*Ipomoea reptana Poir*) is one type of vegetable crop that is short-lived, has economic value, and also has a high nutritional content, namely vitamins A, B, C, protein, calcium, phosphorus, sitosterol, and mineral materials, especially iron that is useful for the growth of the body and health (Anonymous, 2000). Hydroponic cultivation is one alternative that can be used to cultivate land kale. In hydroponic cultivation, the plant will obtain nutrients from the nutrient solution specially prepared. The nutrient solution can be administered in the form of a puddle or a state of flow. Planting medium used in hydroponics systems can be derived from natural materials such as gravel, river sand, coconut fiber, rice husk, pumice stone, peat, and pieces of wood or artificial material such as brick shards (Suhardiyanto, 2011). In the hydroponic cultivation of vegetables, especially kale land, the need for special attention to the use of media cropping, because not all hydroponic growing media substrates can be used for the cultivation of vegetable kale in this land. There need to be special requirements to prop up the roots and can withstand ground spinach nutrients that vegetables grow well.

Nutrition is a very important factor for success in growing hydroponically, because without nutrients certainly can not grow hydroponically. Nutrition or macro and micronutrients must exist for plant growth. Each type of nutrient has a nutrient composition of different (Perwitasari *et al*., 2012). The utilization of organic material can be an alternative as a replacement or additional nutrients for plants in hydroponic watercress land.

One alternative for vegetable kale is organic nutrients contained in wastewater from the manufacturing process known that contain nutrients and are useful for plant growth.
There are many reasons why hydroponic cultivation was carried out, as well as a profitable activity because it can provide vegetables from the home environment, and also can obtain foodstuffs to avoid contamination by chemical fertilizers. Food or nutrients required in the cultivation of hydroponic farming is dissolved in water, so it can be taken into account, and set the concentration of fertilizer is used carefully as required course (Hirawan, 2003). The use in the cultivation of hydroponic systems is expected to improve the growth and yield of kale land. To find out the terrestrial plant growth in hydroponic watercress, it is necessary to research the effects of planting media and the concentration of waste liquid manure out to the swampland in hydroponic growing. The purpose of this study was to investigate the effect of planting medium and the concentration of waste liquid manure out of the land kale growing hydroponically.

RESEARCH METHODS

The research was conducted in field trials in Suco Manleuana (Dili), whereas the research period commences on 29 April 2018 until May 30, 2018. The equipment used in this study is a manual spray bottle of 1 liter, polybag size 20 x 25 cm, label treatment, a bucket, a scoop, a ruler, a pH meter, digital scales, brown envelopes, and stationery and digital cameras. Materials used in this research are river sand, rice husk, seed varieties of kale Bangkok land, water wells, sewage tofu, coconut water, and Effective Microorganism 4 (EM4). Observations made consisted of plant height (observations on the first week to the fourth week after planting / 1-4 MST), the number of leaves (observations on the first week to the fourth week after planting / 1-4 MST), and the fresh weight of spinach cropland (observations on the fourth week after planting / 4th MST).
This research is a field experiment with the design used is Random Design Group (RAK) factorial design with two factors. The first factor is the media's treatment plant consists of three types of growing media: M1: rice husk charcoal, M2: Sand River, and M3: Sand river + rice husk. The second factor is the provision of waste liquid fertilizer know which consists of four levels: $P_{0:}$ Provision of waste liquid manure out of 0%, $P_{1:}$

- Provision of waste liquid manure out of 10%, $P_{2:}$ Provision of waste liquid manure out of 20%,
- $P_{3:}$ Provision of waste liquid manure out 30%, and P4: Provision of waste liquid manure out of 40%. Each treatment was repeated 3 times to obtain 45 combined treatments.

Data obtained from the research carried out the analysis of data using analysis of variance, or Analysis of Variance (ANOVA) (by way of manual counting) to determine whether there is an influence of the growing media and concentrated liquid fertilizer waste out against the land kankung hydroponic growth. If the results of the analysis of variance showed a significant interaction effect it will proceed with further tests to know the degree of difference between treatments using the Duncans Multiple Range Test (DMRT) at the 5% significance level (Sastrosupadi, 2000).

RESULTS AND DISCUSSION

Liquid fertilizer from waste out of wastewater is fermented out, coconut water, and EM4 for 10 days starting from April 27 to May 7, 2018. Liquid fertilizer from waste out that has been through the process of fermentation for 10 days and then taken to the laboratory for analysis content of nutrients nitrogen (N), phosphorus (P), and potassium (K). Based on the results of laboratory analysis showed that the liquid fertilizer from the waste contains nutrients out of the total-N: 1.165%, P: 0.052%, and K: 1.144%.

Parameter Of The Number of Kale Land Leaves: Results of analysis of variance on the number of leaves of kale cropland show that in the first week of observation there is no realinfluence on the interaction between the planting medium and the use of waste liquid manure out of the kale leaves landline number. But the factor of growing media is a real impact, as well as the waste liquid fertilizer factor out there, is also a noticeable effect so that on each of these factors continued by real difference test honest with a significance level of 5%. Results of analysis of variance on the second week, week III, and IV all showed the presence of interactions between the planting mediumand the use of waste liquid manure out of the kale leaves landline number. Analysis of observations II, III, and IV MST conducted further tests using Duncan's Multiple Range Test (DMRT) at a 5% level which aims to determine the level of difference between treatments.

Effect of Planting Media Of The Number of kale Land Leaves At Observations Week I

treatment Media	Total	Average	notation
Rice Husk Charcoal (A)	65	4.33	b
River sand (P)	60	4	a
Mixture A + P	62	4.13	ab
HSD 0.05		= 0.27	

Description: The numbers followed by the same letter in the column notation means significantly different at the level of the 5% HSD test.

Effect of Tofu Liquid Fertilizer on the Number of Leaflets of Kale Land at Observations Week I

The treatment of Fertilizer	Total	Average	notation
Concentration 0% concentration 10%	35	3.88	a
concentration 20% concentration	36	4	ab
30% concentration of 40%	36	4	ab
	42	4.66	c
	38	4.22	ab
HSD 0.05		= 0.35	

Description: The numbers followed by the same letter in the column notation means significantly different at the level of the 5% HSD test. Further tests with an honestly significant difference test (HSD) at the level of 5% show that the planting medium rice husk has the highestproduction potential compared to two other growing media. While the concentration of waste liquid fertilizer knows who has high production potential, namely the concentration of 30%.

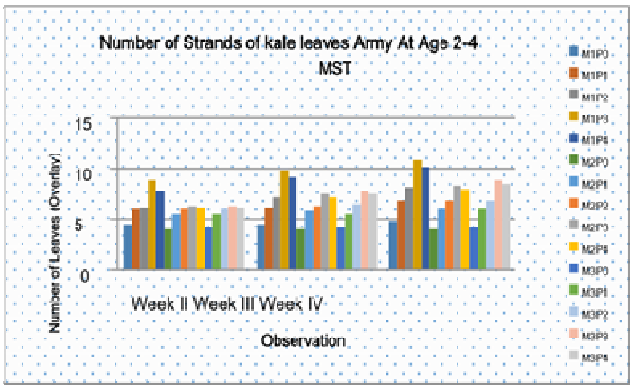
Value Average of the Number of Leaflets of Kale Land At Age 2-4 Weeks After Planting.

Treatment	On the Mean ValueObservations 2-4 Weeks After Planting		
	I	II	III
M1P0	4.5 abc	4.5 abc	4.83 c
M1P1	6 de	6.16 def	6.83 ef
M1P2	6,16 ef	7.16 hi	GH 8.16
M1P3	8.83 i	9.83 lm	10.83 lm
M1P4	7.83 h	9.16 l	10.16 l
M2P0	4 a	4 a	4 a
M2P1	5.5 d	5,83 de	6 d
M2P2	6 de	6,33 efg	6.83 ef
M2P3	6,33 efg	7.5 ij	8.33 ghi
M2P4	6,16 ef	7.16 hi	8 g
M3P0	4.16 ab	4.16 ab	4.16 ab
M3P1	5.5 d	5.5 d	6 d
M3P2	6 de	6.5 efgh	6.83 ef
M3P3	6,33 efg	7.83 ijk	8.83 hijk
M3P4	6,16 ef	7.5 ij	8.5 ghij
F.hit 0.05	very real	very real	very real

Description: The numbers followed by the same letter in the column (II-IV) mean DMRT is significantly different at the level of 5%.

Further tests using the Duncan Multiple Range Test (DMRT) at the level of 5% show that starting at MST II observations showed the average value of the number of land kale leaves was significantly different between treatments. The average value of the number of leaves of kale land at the growing media treatment of rice husk and 30% concentrated liquid fertilizer (M1P3) is the mean value of 8.83 is the highest number of leaves on the observation of the Second MST and significantly different from other treatments. Observation of all MST III shows the average value of land kale leaf number is significantly different between treatments. The average value of the number of leaves of kale highest land shown on the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) is 9.83 and is not significantly different from the media's treatment plant rice husk and 40% concentrated liquid fertilizer (M1P4).

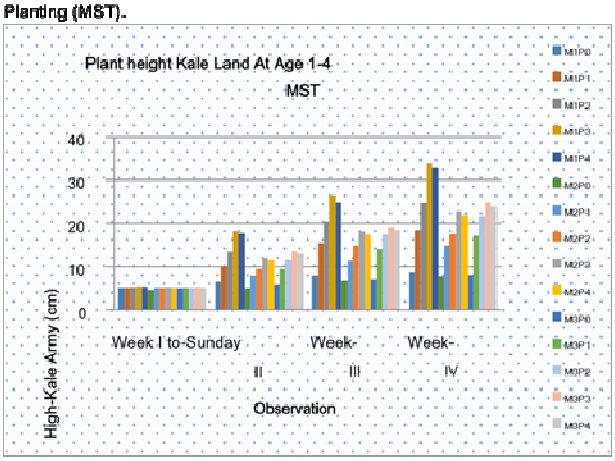
Figure 5 Graph Total leaf kale Army At Age 2-4 Weeks After Planting (MST)



Observation of all MST IV also shows the average value of land kale leaf number is significantly different between treatments. The average value of the number of leaves of kale highest land shown on the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) ie 10.83 and not significantly different from the media's treatment plant rice husk and 40% concentrated liquid fertilizer (M1P4). Figure 5 above shows that the age of the Second MST exhibit a pattern in the number of leaves of kale cropland is a positive quadratic. Increase the number of land kale leaves as you increase the concentration of fertilizer used and shown on all the planting medium (rice husk, river sand, or a mixture of rice husk and river sand). Likewise, on the observation III MST and IV MST, the average value of the number of leaves of kale land also increased in line with the concentrated liquid fertilizer is used and shown on all the planting medium (rice husk, river sand, a mixture of rice husk and river sand).

Parameter High Of Plant Kale Land: Results of analysis of variance to the height of land kale plants showed that in a week I, the second week, third week, and week IV there is significant interaction between the growing media waste and liquid manure out to the plant height kale land. Therefore do further tests using Duncan's Multiple Range Test (DMRT) at a 5% level. Further tests using Duncan's Multiple Range Test (DMRT) at level 5% showed significant differences among treatments. In all I MST observation showed that the highest mean value of land kale plant shown in the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) is 5.46 cm and significantly different from the treatment of river sand growing medium and concentrated liquid fertilizer 0 % (M2P0) and the treatment of the growing media mix rice husk with river sand and concentrated liquid fertilizer 0% (M 3P0). The Second MST observation showed that the highest mean value of land kale plant shown in the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) is 18.36 cm and the treatment was significantly different from other treatments.

Figure 6. Graph High Kale Land Plant Ecosystems At Age 1-4 Weeks After Planting (MST).



Observation of all MST III shows that the highest average value of land kale plant shown in the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) is 26.51 cm and the treatment was significantly different from other treatments. Whereas, the observation of all MST IV shows that the highest average value of land kale plant shown in the media's treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) is 33.85 cm and the treatment was not significantly different from the media's treatment plant rice husk and 40% concentrated liquid fertilizer (M1P4) but significantly different from other treatments. Figure 6 above shows that at the age of I - IV MST show the pattern of land kale plant height increment is positive quadratic. In observation of all I MST already there is a significantly high growth, especially land kale kale cropland. At the age of all visually II MST has demonstrated real plant height differences on a variety of treatments. High kale cropland as you increase the concentration of fertilizer used and shown on all the

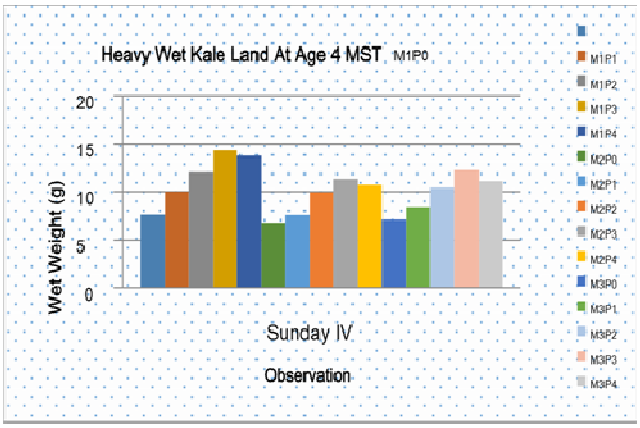
planting medium (rice husk, river sand, a mixture of rice husk and river sand). Media use of different planting (rice husk, sand, and a mixture of rice husk and river sand) and fertilizer wastewater out with concentrations varying from 0%, 10%, 20%, 30%, and 40% showed a difference land kale plant height. Weekly observations show the average value of the high growth of plants increases with the increasing use of liquid fertilizer out of waste. Treatment of growing media rang rice husks and 30% concentrated liquid fertilizer (M1P3) shows a graph of the highest in all ages ie from observation to observation-I to the observation-IV. While Lowest chart for land kale plant height indicated in the treatment of river sand growing medium and the concentration of liquid fertilizer 0% (M2P0) to all age observations (observations to I - IV MST).

Parameters Weight Wet Plant Kale Land: Observations of kale plant fresh weight parameters are only done in the harvesting or age observations 4th MST. Results of analysis of variance to the weight of wet kale cropland show there is a noticeable effect on the interaction between the media and the waste liquid fertilizer should be carried out further tests using Duncan's Multiple Range Test (DMRT) level of 5% to determine the level of difference between treatments.

Treatment	On the Mean Value Observations 2-4 Weeks After Planting		
	I	II	III
M1P0	4.5 abc	4.5 abc	4.83 c
M1P1	6 de	6.16 def	6.83 ef
M1P2	6,16 ef	7.16 hi	GH 8.16
M1P3	8.83 i	9.83 lm	10.83 lm
M1P4	7.83 h	9.16 l	10.16 l
M2P0	4 a	4 a	4 a
M2P1	5.5 d	5,83 de	6 d
M2P2	6 de	6,33 efg	6.83 ef
M2P3	6,33 efg	7.5 ij	8.33 ghi
M2P4	6,16 ef	7.16 hi	8 g
M3P0	4.16 ab	4.16 ab	4.16 ab
M3P1	5.5 d	5.5 d	6 d
M3P2	6 de	6.5 efgh	6.83 ef
M3P3	6,33 efg	7.83 ijk	8.83 hijk
M3P4	6,16 ef	7.5 ij	8.5 ghij
F.hit 0.05	very real	very real	very real

Results of further tests using the Duncan's Multiple Range Test (DMRT) level 5% showed a mean value of land kale plant fresh weight significantly different between treatments. The average value of the lowest kale land wet weight indicated on the growing media treatment of river sand and concentrated liquid fertilizer 0% (M2P0) is 6.80 grams which are not significantly different from the media's treatment plant rice husk mix with river sand and concentrated liquid fertilizer 0% (M3P0) 7.1 grams and was significantly different from other treatments. The highest mean value indicated in the treatment of rice husk growing media and 30% concentrated liquid fertilizer (M1P3) is 14.33 grams and significantly different from other treatments. Figure 6 on heavy graphics wet swampland on the observation to IV MST shows the results of significant growth, where the weight of the plant kale land increases as increased concentrated liquid fertilizer waste out used and occurs in all growing media even though the value of their mean the highest on the media's treatment husk rice with concentrated liquid fertilizer waste out 30% (M1P3), followed by the treatment she mixes rice husk river sand and concentrated liquid fertilizer waste out 30% (M3P3) and next/third at the media's treatment plant river sand and concentrated liquid fertilizer waste out 30% (M2P3).

Figure 7. Graph Weight Wet Kale Land At Age 4 Weeks After Planting (MST).



Wastewater out into fertilizer through fermentation with the aid of bio-activator EM4. Fermentation occurs in an anaerobic environment. During the fermentation process, the microorganisms in the substrate EM4 break into smaller compounds. The fermentation process was carried out for 10 days. Liquid waste out and coconut water contain carbohydrates. The carbohydrates will be broken down into glucose which is an energy sourcefor microorganisms that can speed up the fermentation process. Liquid waste comes out has a protein content of soybeans, which is material manufacturing known. Protein is also found in coconut water. Protein on waste coconut water out and converted into amino acids. Amino acids consist of amino and carboxylic acids. The amino group has nitrogen in its molecular formula, namely NH_2 (Wilbraham and Matta, 1992). The addition of coconut water in the liquid fertilizer from the waste out serves as a source of glucose to be used by microorganisms in the EM4 as an energy source. Microorganisms in EM4 require glucose to be active and break down existing substrates in wastewater know. The results of the activity of microorganisms in EM4 are nutrients that can be absorbed by plants. Fermented liquid fertilizer, the color changes from dark brown to yellow-brown and murky. Liquid fertilizer from waste out who has been so having a slightly acidic aroma as aroma EM4 but not too overpowering. Liquid fertilizer is wasted before being used to fertilize cropland kale dilution following each treatment. Dilution liquid fertilizer made with a percentage of 0%, 10%, 20%, 30% and 40%. The use of growing media and fertilizer concentration wastewater out different effects on groundwater spinach plant growth. The effect of growing media and fertilizer waste liquid out can be seen from the observation of the growth of three parameters: number of leaves, plant height, and weight of wet kale land.

In the analysis results, nutrient N obtained a value of 1.165%, the value is quite good. The element N is a constituent element that plays a role in chlorophyll, proteins, and nucleic acids (foth, 1984). Plant growth is greatly influenced by the number of nutrients available to plants as nutrient nitrogen, phosphorus, and potassium. Nitrogen in an amount sufficient role in accelerating the growth of the plant as a whole, especially a stem and leaves. Nitrogen also serves as a synthesis of chlorophyll, protein, and amino acids, and together with nitrogen phosphorus is used to regulate plant growth overall (Lingga, 2006). K nutrients in the study recorded 1,144%. The value is good and included in the high category.

According to Ethics (2007), generally critical point element K is below 0.1%. Nutrient K function in the regulation mechanism of photosynthesis, translocation of carbohydrates, and protein synthesis (foth, 1984). Analysis of nutrient content of 0.052% P noted that the number had low values. According to Ethics (2007), generally critical point P nutrient levels below levels of nutrients N, at least 0.1%. P element is an element that is not easy to move because it has a dynamic nature. P deficiency resulted in the transfer of energy, development, and metabolism of cells and roots of plants being disrupted (Delvian, 2006). The increasing number of terrestrial plant leaves kale by liquid fertilizer out of waste caused by the availability of nutrients nitrogen and phosphorus are increased in the planting medium. The planting medium is capable of holding nutrient solution is better then the plant will have enough time to take advantage of the nutrients available for growth especially kale leaves landline number.

The formation process leaves inseparable from the role of nutrients such as nitrogen and phosphorus contained in the growing media and available to plants. Both of these elements play a role in the formation of new cells and the main components in the plant making up organic compounds such as amino acids, nucleic acids, chlorophyll, ADP, and ATP. When the second plant nutrient deficiency hence the plant's metabolism will be disturbed so that the process of formation of the leaves to be late (Lakitan, 1996). The number of leaves on the growing media treatment of rice husk and concentrated liquid fertilizer waste out 30% (M1P3) gave the best results compared to treatment planting medium and the concentration of liquid manure out other waste. Leaf growth is vegetative growth which is the role of nutrient nitrogen. According to Wijaya (2008), nitrogen spurs the growth of the organs associated with photosynthesis. Furthermore, broader leaves indicate the availability of nitrogen in the growing medium. Land cultivation hydroponic watercress especially dissimilar substrates with conventional cultivation land kale. Hydroponic cultivation relies on nutrient uptake from the outside given to these plants for planting medium used is a poor nutrient medium, so that the growth of plants (plant height and the number of leaves) depends on the adequacy of nutrient granted (Alviani, 2015).

This is consistent with the results of the analysis in this study for the parameters of the number of leaves and plant height in the treatment of all the planting medium (rice husk, river sand, and a mixture of both) with a concentrated liquid fertilizer of waste out of 0% indicates the average value of the lowest compared with the use of liquid manure waste out 10%, 20%, 30%, 40% on all the planting medium. The addition of plant height occurred in intercalary meristem at the stem segments. Apical meristem activity also causes the multiplication ofnew cells at the end of that plant to be high (Gardner *et al*, 1991). Nitrogen, phosphorus, and potassium are influential in meristem activity. Nitrogen function in a growth spurt. Nitrogen is the building block of protein. Phosphorus is part of the nucleus that controls all activity in the cell including cell division. Potassium in fertilizer serves as the building block of protein. Nitrogen is part of the enzyme that is a biocatalyst for every metabolic reaction. The supply of nitrogen in the form of ions NO3- and NH4 + will affect plant growth. Nitrogen deficiency causes stunted growth. Taken together when the plant nutrients N and K will decrease crop production and make the plants stunted (Lakitan, 2011).

Stunting and plants become stunted or plant height less than normal as seen in the treatment without fertilizer, liquid waste out (0%) or fertilizer with a low concentration, for example at a concentration of 10% as well as with the use of the planting medium are less capable of holding water or solution nutrient. This is indicated in the treatment of M2P0, M2P1, M3P0, M1P0, and M3P1. Each plant has a maximum capacity to absorb nutrients to support growth. The concentration of fertilizer given to plants has a saturation point when exceeding the maximum limit of the ability of plants to absorb nutrients so that when granting excessive fertilizer it will not be absorbed and can also be toxic to plants. Therefore, the concentration of nutrients is too high will cause a decrease in the absorption of nutrients by plants (Sutedjo, 2002). Decreased absorption of nutrients can be seen in the growing media treatment of rice husk and concentrated liquid fertilizer waste out 40% (M1P4) that their mean value is lower than the treatment of rice husk growing media and concentrated liquid fertilizer waste out 30% (M1P3). That is, the waste liquid fertilizer is best to know the concentration of 30% for land kale plant growth and the medium is a medium of rice husk. Visually it is visible on the graph to the age of observations II-IV after the week of planting (MST). Media planting rice husk contributes to better growth compared with planting medium river sand and a mixture of rice husk river sand. That is because the rice husk has different characteristics from river sand or a mixture of rice husk with river sand is its ability to hold water (including nutrients dissolved in water) and the color black to absorb and reduce the intensity of solar heat (Alviani, 2015). Media planting rice husk has advantages as a growing medium with a substrate hydroponics system that is fairly porous media and has enough ability to hold water. Sufficient ability to hold water means can also hold nutrients in growing media. This is what supports that media treatment plant rice husk and 30% concentrated liquid fertilizer (M1P3) showed a mean value of the wet weight of the plant as a result of plant growth kale highest ground. The fresh weight of a plant is related to the amount of water absorbed, compounds that plants need in large quantities in any organ, but the water content of plant tissue can be volatile or unstable, according to age, the ability of maximal absorption, and also influenced by environmental factors (Salisbury and Ross, 1995).

Media rice husk contains nutrients and can store water needed to grow crops, supported by the results of research and Ninik Bambang (2011) that rice husk ash composition is dominated by silica as SiO_2 (94.4%), Al_2O_3 (0.61%), Fe_2O_3 (0.03%), C_an O (0.83%), MgO (1.21%), K_2O (1.06%), Na_2O (0.77%). This is presumably because the element nitrogen (N), which is absorbed by the roots is used for overall growth, especially in the trunk, branches, and leaves of tomato plants. Media planting rice husk mixture river sand showed a mean value of the wet weight decreased as shown in the second-best treatment is the treatment of growing media mix rice husk with river sand and 30% concentrated liquid fertilizer (M3P3) due to the ability to hold water and nutrients decreases. The subsequent decline shown in the third-best treatment is the treatment of growing medium river sand and 30% concentrated liquid fertilizer (M2P3). This is because the ability to hold water and nutrients is not as good as rice husk as well as the growing media mix rice husk with river sand. A plant will grow well when the nutrient needed is available in a form that is readily absorbed by plant roots. The improvement in the growth of the plant will increase its weight of the plant (Dwidjosapoetro, 1985).

Availability of water and nutrients in growing media influence the development of plant roots which reflect the absorption of nutrients that will determine the outcome of the growth of a plant (Nyakpa *et al*., 1998). Overall, the production of kale land is best seen from the number of leaves, plant height, and weight of the wet plant's swampland in hydroponic shown in the media's treatment plant rice husk and concentrated liquid fertilizer waste out 30% (M1P3) and not significantly different from treatment rice husk growing media and concentrated liquid fertilizer waste out 40% (M1P4). It has similarities with the research results of Aris *et al*., (2014) that rice husk growing media with a concentration of liquid fertilizer from waste out 40% gives the best production of the commodity mustard greens (Brassica juncea var. Tosakan). The results of this study are also consistent with the results of research and Yuwono Siswadi (2015) stated that the rice husk is one of the best growing mediums for hydroponics than sand and rice husk media, especially for lettuce plants (Lactuca sativa L).

Enclose

Conclusion

Based on the results of the research study titled Growing Media Influence And Waste Liquid Fertilizer Concentration on Growth Know Kale Army (Ipomoea Reptana Poir) By Hydroponics can be concluded that the use of the planting medium and the concentration of waste liquid manure know giving effect to the growth of hydroponic watercress land. Real influence is shown by the results of analysis of variance on the parameters of the number of leaves (the second week of observation, all-III, and all IV) and heavy wetland kale plants also showed no real influence. Results Further tests using the Test Distance Duncan or Duncan's Multiple Range Test (DMRT) showed significant differences among treatments. Treatment shows the growth and yield of kale best land indicated in the treatment M1P3 (rice husk growing media and the concentration of waste liquid manure out of 30%) with a mean value of 10.83 the number of leaves, plant height 33.85 cm, and a wet weight of 14.33 grams.

Suggestion

With the completion of this study the authors can submit suggestions as follows:

- Other growth parameters such as leaf area, dry weight, and diameter of the rod are expected to be used for further research so that the diversity of data sources.
- Utilization of tofu waste is not only liquid waste but can also utilize solid waste is tofu, namely tofu dregs.
- The selection of the research object can be replaced with other crops.
- Testing of the nutrient content of the manure can be performed on macronutrients and another micro.

REFERENCES

Alviani, P. 2015. Planting Hydroponics For Beginners. Jakarta: Seed Publisher.

Anonymous. 2000. Kale Germplasm characteristics. Bulletin Germplasm Vol. 12 # 1. Research Institute Vegetable Crops. Lembang.

Delvian, 2006. Important Factors for Growth Trees In the Forest Plantation Development Industry. Essay. Forestry Department: Faculty of Agriculture, University of North Sumatra.

Dwidjosepoetro, D., 1985. Introduction to Plant Physiology. Jakarta: Gramedia. Foth, HD, 1984. Fundamentals of Soil Science. Yogyakarta: Gadjah Mada University Press.

Gardner, Franklin P., Mitchell Pearce RB and RL 1991. Cultivation Plant Physiology (tr. Herath Susilo), Jakarta: UI-Press.

Hirawan, A. 2003. hydroponics (Grow Grow Without Media Land). Bandung: M2S Bandung.

Lakitan, B. 1996. Physiology Plant Growth and Development. Jakarta: PT. King Grafindo Persada. Phallus, P., 2006. Grow Hydroponics Grow Without Soil. Jakarta: Sower Self Reliance.

Nyakpa, M, Y, A, M. Lubis: MAPulung. AG Amrah. Munawar A. GB Hong: N. Hakim. 1998. Fertility Soil.

Lampung: Lampung University Press.

Perwitasari, B., M. and Wasonowati Tripatmasari, C. 2012. " Effect of Plant Nutrition Against Media Plant growth and yield of mustard (Brassica juncea L.) With Hydroponics System ". Madura: Faculty of Agriculture, University of Trunojoyo.

Salisbury FB and CW Ross. 1995. Plant Physiology, Plant Development, and Environmental Physiology. Volume Three. Tr. DRLukman and Sumaryono. Bandung: ITB.

Sastrosupadi, A. 2000. Agriculture Sector Study Design. Yogyakarta: Canisius.

Siswadi and Yuwono, T., 2015. Various Media Influence on Growth and Yield of Lettuce (Lactuca sativa L) Hydroponics. Solo: Faculty of Agriculture, University of Slamet Riyadi.

Suhardiyanto H. 2011. For Cultivation Hydroponics technology. Bogor: Faculty of Technology Agriculture. IPB.

Sutedjo, MM 2002. Fertilizers and Fertilization way. Jakarta: PT. Rineka Reserved. Wilbraham, Anthony C. and Matta, Michael S. 1992.

Introduction to Organic and Biological Chemistry, Jakarta: UI Press.

****