



Media Influence of Planting And Concentration of Organic Liquid Fertilizer on The Growth And Results Lettuce (*Lactucasatival.*)

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ABSTRACT

The lettuce is a leafy vegetable that comes from the (state) temperate. Historically, this plant has been cultivated since 2500 years ago. Lettuce plants came from the Americas. This is evidenced by Christopher Columbus in 1493 that found the plant lettuce in the western Hemisphere and the Bahamas (Rukmana, 1994). This study aims to determine the effect of growing media on growth factors, the influence of the concentration of liquid organic fertilizer (POC), the interaction effect of these two factors and yield of lettuce. The results showed There is a very real effect of growing media composition in all parameters studied were long observation of plants, number of leaves and fresh weight per plant. The best results were achieved by treatment K2 is 2 kg of manure per plant. There is a very real effect of concentrated liquid fertilizer (POC) "Supermer" on all parameters studied were long observation of plants, number of leaves and fresh weight per plant. The best results are achieved by P4 treatment The concentration POC 2 ml / liter of water. There is no real interaction due to a combination treatment of the media composition and concentration of liquid organic fertilizer (POC) "Supermes".

Keywords: *Growing Media, Concentration Liquid Organic Fertilizer and GrowthCrop*

1. INTRODUCTION

Lettuce is the leaf vegetables from the region (country) temperate. Historically, this plant has been cultivated since 2500 years ago. Lettuce plants came from the Americas. This is evidenced by Christopher Columbus in 1493 that found the plant lettuce in the western Hemisphere and the Bahamas (Rukmana, 1994).

Lettuce is a vegetable species favored by the people of Indonesia. Customers ranging from lower-class society to the upper-class society. Lettuce is often eaten raw as a salad side dish delicious meal accompanied by sambal. Foreign cuisine such *assalad* using lettuce to the mix, as well *ashamburgers*, *hotdogs*, and several other types of cuisine. This shows that the social aspect of Indonesian people easily accept the presence of lettuce for daily consumption (Haryanto *et al.*, 1995).



In 2000, the Singapore government wants to develop vegetable crops in Riau, one of which is the lettuce. Vegetable production in Riau Province is still relatively low. The low production of leafy vegetables particularly apparent with production in 2005, reaching 2,516 tons with an area of 365 ha of arable land are scattered throughout the district (Central Statistics Agency of Riau Province, 2006).

The low productivity of lettuce plants is affected by many factors. One important factor that can affect the growth and production of a plant is the availability of nutrients. Can be improved nutrient availability in the soil to improve soil conditions through fertilization.

In the ground is already available in natural foods, but not all of the land provide enough food for the plant. Land that does not provide the food needs to be assisted to increase the levels of the food in the ground, by giving fertilizer. One type of fertilizer given is an organic fertilizer that serves to provide organic nutrients for plants, improve soil structure and water retention in the soil. Organic fertilizers have an important function to loosen the surface soil layer, increasing the population of microorganisms, enhance absorption and store water, all of which can increase soil fertility as well (Sunardjono, 2005).

Manure as well as organic fertilizer derived from domesticated animals include cow manure, dung water buffalo, goat manure, chicken manure and others. Cow dung is the type most dominant manure is used, because in addition to high haranya content is also readily available, it is caused by a number of cattle keepers so that the chairs can be used as fertilizer.

Manure has many advantages over synthetic fertilizers. Besides Nitrogen (N), phosphorus (P) and Potassium (K) is quite high, manure contains enough nutrients complete. Given the importance of organic fertilizers mentioned above, it is necessary to do research on the growing media composition and the use of other organic fertilizers on growth and yield of lettuce plants.

2. METHODS

This study used a randomized block design (RAK), where treatment using two factors: the first factor and the second factor media composition concentration of liquid organic fertilizer (POC) "Supermes". Each treatment was repeated 3 with two plant samples.



Analysis of the data used to determine the effect of treatment on the experimental analysis of variance F table is 5%. As for knowing which treatment is different then used to test the Least Significant Difference (LSD) with a level of 5% (Yitnosumarto, 1991).

3. RESULTS AND DISCUSSION

3.1. Plant Long

Long Statistical analysis showed that the plant no significant interactions between the planting medium with a concentration factor of liquid organic fertilizer to the variable length of lettuce plants. Separately treatment plant media provides highly significant effect ($F_{count} > F_{1\%} > F_{5\%}$) to the length of the plant at the age of observations 14, 21, 28 and 35 days after transplanting, whereas treatment concentration of liquid organic fertilizer significant effect ($F_{1\%} > F_{hitung} > F_{5\%}$) of the variable length crop at age 14, a significant influence ($F_{hitung} > F_{1\%} > F_{5\%}$) in the observation aged 21, 28 and 35 days after transplanting.

Average length of lettuce plants at the media's treatment plant and the concentration of liquid organic fertilizer at various ages observations can be seen in Table 1 below.

Table 1. Average length of Lettuce Plants In Treatment Media Concentration Plant and Fertilizer in Different AgeObservation

Treatment	Age Observation(HST)			
	14	21	28	35
K1	6.13 a	9.08 a	15,42 a	21.79 a
K2	6.75 b	11.08 b	16.25 b	24.67 b
BNT 5%	0,37	0,79	0,54	0,94
P1	6,00a	9.00 a	14.58 a	20.25 a
P2	6.25 ab	9.50 ab	15.25 a	22.67 b
P3	6.58 b	10.25 b	16.17 b	24.25 c
P4	6.92 b	11.58 c	17.33 c	25.75 d
BNT 5 %	0.52	1.12	0.77	1.33

Remarks: the figures are accompanied by the same letter are not significantly different shows on LSD 5%

In table 1 above shows that in some of the observations seen growing media factor K2 treatment gives better value than K1. At the end of the observation value 24.67 cm K2 and K1 are significantly different with 21.79 cm. While liquid organic fertilizer concentration factor at the end of the treatment observation P4 provide better value is 25.75 cm and significantly different from the P3 (24.25 cm), P2 (22.67 cm) and P1 (20.25 cm).



Sri opinion Setyadi accordance Harjadi (2002), extension of the cells occurs due to the enlargement of new cells. This is supported by the presence of certain hormones that existed at the plant itself and the water content in the soil is also the sugar. This enables the cell walls stretch. Cell enlargement area directly behind the growing point. If the cells in this area is enlarged vacuole-vacuoles absorb relatively large amounts of water. As a result of the absorption of water and the presence of cell extenders hormone, it will be elongated cells, the cell walls grow thicker and stacked cellulose made from sugar so that it causes the cells to multiply and length.

Manure contains macro and micro nutrients. Solid manure (macro) a lot of phosphorus, nitrogen and potassium (Mahrus, Bambang Wicaksono, Nurlina, Cholil, & Sri Wiwoho, 2017). Micro-nutrients contained in the manure such as calcium, magnesium, sulfur, sodium, iron, copper, and molybdenum. The above nutrients very useful to improve plant growth and development.

Manure and other organic fertilizers may serve to increase soil organic matter content, providing micro-nutrients and improve soil structure. The use of these materials can also enhance microbial growth and turnover of nutrients in the soil. Other organic matter that can cause the nutrients they contain and increase the availability of other nutrients in the soil. Organic matter can save N fertilizer, but can also reduce the use of fertilizer P and K as well as increase crop production (Anonymous, 2010).

3.2. Number of leaves

Statistical analysis showed that the number of leaves was no significant interaction between the factors of planting medium with a concentration of liquid organic fertilizer to variable number of leaves of lettuce plants. Separately treatment plant media give real effect ($F_{1\%} > F > F_{5\%}$) of the number of leaves of the plant at the age of observation of 14 and 21 days after transplanting, the effect is highly significant ($F_{count} > F_{1\%} > F_{5\%}$) to variable number of leaves of the plant on age 28 and 35 days after transplanting, whereas treatment concentration liquid organic fertilizers do not provide significant effect ($F_{count} < F_{5\%} < F_{1\%}$) at the age of observation of 14 days after transplanting, the real influence ($F_{1\%} > F > F_{5\%}$) at the age of observation of 21 days after transplanting and highly significant effect ($F_{count} > F_{1\%} > F_{5\%}$) in the observation age 28, 35 days after transplanting.



The average number of leaf lettuce plants on the media's treatment plant and the concentration of organic liquid fertilizer at various ages observations can be seen in table 2 below.

Table 2. Average Number of Plants Leaf Lettuce On Media Treatment Plant and Fertilizer Concentration in Various AgeObservation

Treatment	Age Observation(HST)			
	14	21	28	35
K1	3.83 a	5.83 a	7.92 a	10.67 a
K2	4.13 b	6.25 b	8.29 b	11.96 b
BNT 5%	0,28	0,31	0,26	0,49
P1	3,75a	5.58 a	7.75 a	10.50 a
P2	ab3.92	ab5.92	8.00 ab	11.08 ab
P3	4.08b	6.17 b	8.17 b	11.58 b
P4	4.17b	6.50 b	8.50 b	12.08 b
BNT 5%	0.40	0.44	0.36	0.69

Remarks: the figures are accompanied by the same letter are not significantly different shows on LSD 5%

in table 2 above shows that in some of the observations seen growing media factor K2 treatment provide better value than K1. At the end of the observation K2 provides significantly different value of 11.96 and with K1 is 10.67. While liquid organic fertilizer concentration factor at the end of the treatment observation P4 provide better value is 12.08 and not significantly different from P3 (11.58) and P2 (11,08) but significantly different from the P1, which is 10.50.

Vegetative growth phase include the growth of roots, stems and leaves. In this phase of photosynthesis plants require a form of carbohydrates which will then be converted into energy for plant growth and development (Ali, 2015). At first, the carbohydrate derived from the endosperm storage network, when growth begins from the next carbohydrate germination will be formed from the process of photosynthesis after the plants have leaves. The process of photosynthesis allows the rapid increase in size as the number of leaves (Ashari, 1995).

According Kusumo (1984) in Darliah *et. al.* (1994) that plant growth is the result of the growth and development of cells that depend on the supply of food, whether provided through the leaves and is absorbed by the roots out of the ground for the process of metabolism and protein synthesis. Meanwhile, according Sitompul and Guritno (1995) stated that an increase of the cells causing the cell walls grow thicker. In such a situation we



need a sufficient amount of carbohydrates, because with enough carbohydrates will produce enough energy to accelerate plant cell enlargement, which in this case is expressed in the form of long plant.

Liquid organic fertilizer is a fertilizer that has a high effectiveness which can speed up or improve the growth, flowering and fruiting. Many contain liquid organic fertilizer NPK which is the main nutrient for plant growth and development are indispensable for the growth of vegetative parts of plants such as leaves, stems and roots (Sutejo, 1992).

3.3. Wet Weight Per Plant

Statistical analysis of wet weight per plant showed that no significant interaction between the factors of planting medium with a concentration of liquid organic fertilizer to variable number of leaves of lettuce plants. Separately treatment plant media provides highly significant effect ($F_{count} > F_{1\%} > F_{5\%}$) of the fresh weight per plant at the end of treatment, while treatment concentration of liquid organic fertilizer did not give a significant influence ($F_{hitung} < F_{5\%} < F_{1\%}$) at the end observation.

The average wet weight per plant lettuce in the treatment of planting medium and the concentration of liquid organic fertilizer at various ages observations can be seen in Table 3 below.

Table 3. Average weight per plant Wet Lettuce On Media Treatment Plant and Fertilizer Concentration on Final Observations (35 Days After Transplanting).

Treatment of	Wet weight per plant (g)
K1	183.33 a
K2	191.58 b
BNT 5%	5, 31
P1	172.67 a
P2	182.67 b
P3	189.17 b
P4	c205.33
BNT 5%	7.50

Description: the figures are accompanied by the same letter are not significantly different shows on LSD 5%

In table 3 above shows that at the end of the observation K2 provides better value than the 191.58 gr 183.33 gr K1 and K2 which provide significantly different values K1. While liquid organic fertilizer concentration factor at the end of the treatment observation P4



provide better value ie 205.33 g and significantly different from the P3 (189.17 grams), P2 (182.67 grams) and P1 (172.67 grams).

Plant lettuce has shallow roots and require that unstructured loose soil to support plant growth and development optimal. According Harjati and Indrawati (2004) that the pad a generally shallow rooted plants will have the sensitivity to drought and will show a faster response to variations of fertilization when compared to plants rooted in.

Crop yields depend on all the events that occurred during the previous period. Furthermore, plant growth is a measure that can not be behind where the indicator can be seen from the increase of the size and number of parameters of vegetative growth and generative plant (Harjadi, S, 1979).

According Sinamungkalit (2006) that organic fertilizer is very useful for the improvement of agricultural production both in quality and quantity, reduce environmental pollution and improve the quality of land in a sustainable manner. Organic fertilizer is a major source of soil nitrogen and contribute to improve the physical, chemical and biological soil.

There are several advantages of organic fertilizers include: organic fertilizer contains micro elements are more complete than inorganic fertilizers; organic fertilizer will give life soil microorganisms which have become better friends with the farmers; organic fertilizer helps maintain soil moisture and reduce the pressure or tension structure of soil on the roots of the plants; use of organic fertilizer also plays an important role in treating / maintaining soil fertility levels are already in a state of excessive fertilization with inorganic fertilizers / chemicals in the soil; quality plants that use organic fertilizers would be great if compared with chemical fertilizers that plants are not susceptible to disease and healthier plants (Anonymous, 2012)

4. CONCLUSION

There is a significant influence on the composition of the growing media in all parameters of observation under study is long crop, the number of leaves and fresh weight per plant. The best results were achieved by treatment K2 is 2 kg of manure per plant. There is a very real effect of concentrated liquid fertilizer (POC) "Supermer" on all parameters studied were long observation of plants, number of leaves and fresh weight per plant. The best results are achieved by P4 treatment The concentration POC 2 ml / liter of water and



There is no significant interaction due to a combination treatment of the media composition and concentration of liquid organic fertilizer (POC) "Supermes".

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