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Application Of Vegetable and Fruit Waste Liquid Organic Fertilizer (POC) as Nutrition for Red Chili Pepper Plant Growth (*Capsicum Annuum L*.)

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ABSTRACT

The purpose of this study was to determine the effect of liquid organic fertilizer in increasing the growth of red chili pepper plants because inorganic fertilizers utilization was widespread among farmers. Thus, the idea emerged for the application of liquid organic fertilizers. The application time and place of liquid organic fertilizer were carried out in the experimental field of STIPER Sawahlunto Sijunjung. The design used was a Randomized Block Design (RAK) with five levels of treatment and five groups in order to obtain 25 experimental units. The application of market waste POC on red chili pepper plants has not significantly affected the growth of red chili pepper plants. Treatment of market waste POC at a concentration of 500 (ml/L) is the optimal dose/dose for increasing the number of leaves by 115 strands (control 63 strands) and the increase in plant height by 71.40 cm (control 55.40 cm). In general. POC applications of market waste are still unable to achieve optimal growth and yields, and this is because there is no addition of nutrients to plants to support growth.

Keywords : *LOF, Cayenne Pepper, Market Waste*

1. INTRODUCTION

In Indonesia, red chili pepper (*Capsicum Annuum* L.) is included in the vegetable and fruit group of horticultural crops with high economic value. According to Dermawan R. and A. Harpenas. (2010), demand for red chili tends to increase and is relatively high, both for the domestic market and for exports to foreign countries, such as Malaysia and Singapore. Chili comes from the Americas, to be precise, the Peru area, and spread to the countries of the Americas, Europe, and Asia, including Indonesia. According to Andayani & Sarido L. (2009), red chili pepper contains nutrients and vitamins, including calories, protein, fat, calcium, vitamins A, B1, and vitamin C. This chili is used as a cooking spice or as a raw material for various food industries, and medicines make chili more attractive to cultivate. Like other regions in Indonesia, the price of red chili in West Sumatra Province also fluctuates, sometimes the prices becomes increasingly high, especially during celebrations or significant holidays such as religious holidays and New Year.

In the last two years, red chili pepper production in Sijunjung Regency, West Sumatra, has increased. In 2018 as many as 2,117 quintals, and in 2019 as many as 2,131 quintals, this shows bright prospects for increasing F1 red chili production (Central Bureau of Statistics Sijunjung Regency, 2020).

Red chili production needs to be maintained and increased so as not to experience a decrease in production caused by various factors. One of them is the factor of plant cultivation and maintenance.

In efforts to maintain and increase the yield of red chili in addition to the use of inorganic fertilizers, adding organic matter into the soil is essential in meeting the nutritional needs of chili plants, both macro, and micronutrients. Organic matter can be in the form of organic fertilizer in either solid or liquid form. However, organic fertilizer in liquid form is more easily absorbed by plants. The use of liquid organic fertilizer (POC) in plants cultivated on dry land will be much different than on wetland. If applied to wetland, the concentration will decrease due to abundant water. Liquid organic fertilizer (POC) contains essential microbes and is more efficient in its use. One of the liquid organic fertilizers used is liquid organic fertilizer from market waste.

Market organic waste (banana peel, tomato, onion, spinach, kale, papaya, etc.) is an organic waste that has the potential to be used as organic fertilizer.

In addition to utilizing market waste as liquid organic fertilizer, it is also a conservative measure that can save the environment. Based on the results of a laboratory study, liquid organic fertilizer derived from vegetable and fruit waste starch meets fertilizer requirements, both as a source of macro and microelements. The content of macro elements, which include N, P, K, Ca, Mg, and S, ranges from 101-3,771 mg.l-1, while the micronutrients include Fe, Mn, Cu, and Zn, ranging from 0.2 to 0.62 mg.l-1 (BPTP Jakarta, 2011). Due to the complete nutrient content contained in market waste, it is expected to be able to meet the nutritional needs of red chili pepper plants. In the research of Novriani, Dora Fatma Nurshanti, and Ardi Asroh, A. (2019), the administration of POC leaves on organic-based sweet corn plants can increase plant height, number of leaves, length of the ear, the diameter of the ear, and weight of the cob and the best concentration of POC was achieved at 200 mL/L of water treatment,

Based on these concentrations, researchers researched POC for application to red chili pepper plants, intending to see the effect of POC administration in increasing the growth of red chili pepper (*Capsicum Annuum L*.).

2. MATERIAL AND METHOD

This research was carried out in Jorong Pisang Kolek, North Taratak Baru Nagari, Tanjung Gadang District, Sijunjung Regency. The materials used in this study were: 5 kg of fruit waste, 5 kg of vegetable waste, 5 liters of rice washing water, and 5 kg of coconut water. 1 kg of young bamboo shoots as ZPT, 1 cup of brown sugar, EM4, seeds of red chili pepper of the Lado F1 variety, soil, goat manure as basic fertilizer, and water.

In this study, a Randomized Block Design (RAK) was used with five groups and five levels of treatment. The treatment given is as follows;

A = Control

B = POC Fruit waste 200 ml/plant each time given)

C = POC Fruit waste 300 ml/plant each time given)

D = POC Fruit waste 400 ml/plant each time given)

E = POC Fruit waste 500 ml/plant each time given)

The manufacture of liquid organic fertilizer from market waste is carried out for one month, at the same time as the chili seed nursery, intended to adjust the planting time and the completion of the manufacture of liquid organic fertilizer from market waste.

Stages in Making POC :

The treatment was given after the chili plants were one week after planting. Application of liquid organic fertilizer from market waste following the concentration of each treatment has been determined three times during the vegetative period, at the age of 7, 21, and 35 days after planting (DAT) with an interval of once every two weeks and added two times of follow-up. The generative period was at the age of 56 and 77 days after planting (DAT), so there were five times of fertilization during the study. The treatment was given when watering around the plant stems in the morning by pouring it.

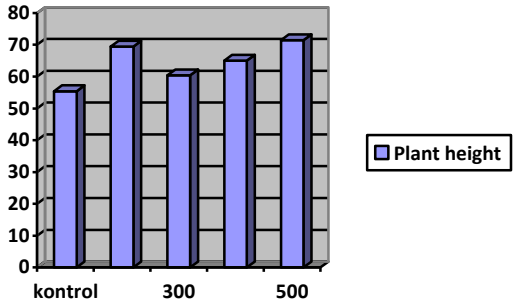
The parameters observed in the growth and yield of red chili pepper plants were as follows: Plant Height (cm), Number of Leaves (strands), and Number of Planted Fruits (fruit). Because of parameters such as the number of branches, many flowers, and others, further research will be carried out on the effect of pruning chili plants.

3. RESULT AND DISCUSSION

Plant Height

The average height of red chili pepper plants at 35 DAP observations was only prioritized at 35 DAP because

35 days of age was the maximum limit for vegetative growth of chili plants, and at that time, the plant transitioned from vegetative growth to plant generative growth. The average plant height can be seen in the plant height chart below.

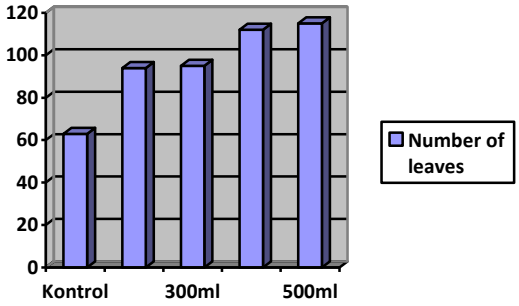


Plant Height Chart

The graph of plant height shows that the highest plant was found in the treatment of 500 ml/plant. This was caused by several factors such as macronutrients N, P, and K and the intensity of sunlight energy received by the plant. Following the opinion of Sarif in Andayani and Sarindo (2013), nitrogen and phosphorus elements are also directly involved in increasing the energy of sunlight used during the photosynthesis process to produce proteins and fats used to stimulate plant height growth. Another factor that caused the difference in plant height was that some of the sample plants observed were in a slightly shaded place, so it became the leading cause.

Total Leaf

The average leaves quantity of red chili pepper plants at 35 DAP can be seen in the leaves quantity chart below :



Leaf Total Chart

Based on the graph of the number of leaves, it can be seen that the highest number of leaves was found in the treatment of 500 ml/plant. This is because the plant is in the vegetative phase, so leaf growth increases rapidly. One of the nutrients that play an essential role in the formation of leaves is nutrient N (nitrogen) which functions in the formation of chlorophyll, and this is also not far from the opinion of Andayani & Sarido, L. (2009), protein and fat also play a prominent role in the process. Photosynthesis, this element is present in market waste POCs. In addition, nitrogen in organic fertilizers has an essential role in the synthesis process of chlorophyll, protein, and enzymes to increase the photosynthesis process.

The process of photosynthesis in plants will depend on the number of leaves and the influence of sunlight. Whereas the number of branches increases, the number of leaves increases.

Total Fruits Per plant (ea)

The average number of red chili peppers after 140 DAP can be seen in Table 1.

Table 1. The average number of red chili peppers after 140 DAP

Treatment	Average (ea)
Control	17
POC 200 ml /plant	21
POC 300 ml / plant	23
POC 400 ml / plant	28
POC 500 ml / plant	27

Based on the table above, if F count > F table 5%, further tests are carried out with the BNJ test (Honest Significant Difference) at a 5% significance level. Because the data is F count < F table, no further test is carried out.

In Table 1 above, it can be seen that the highest number of fruit was found in the treatment (POC of fruit waste 400 ml), as many as 28 pieces. This is because the more doses of liquid organic fertilizer, the more absorbed by the plant so that it can increase the number of fruit. In addition, the number of plant branches will also affect the number of fruits.

According to Andayani & Sarido, L. (2009), the availability of a large amount of nitrogen and phosphorus nutrients can accelerate flowering and fruit formation. Furthermore, a lack of nitrogen and phosphorus nutrients can cause plant metabolism and development disturbances, including inhibiting flowering.

4. CONCLUSION

Based on the results of the research on the effect of liquid organic fertilizer from fruit and vegetable waste on the growth of red chili pepper plants, it can be concluded that: market waste has not been able to provide a significant influence on the growth and yield of red chili pepper plants. Giving market waste POC with treatment E (concentration 500 ml/L) is the best treatment for increasing the number of leaves.

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