

UTILIZATION OF ORGANIC WASTE BIOMAS AGAINST GROWTH TEST AND RESULTS OF SAWI CROPS

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ABSTRACT

The abundant condition of organic waste in urban areas of Surabaya requires a solution not only regarding the process of compost, but also how to utilize the biomass organic waste in a framework to socialize the use of urban yard narrow land into a form of cultivation of vegetables that contribute to the nutrition for the family. This potential will be synergistic with Surabaya city government policy related to urban yard Empowerment program that inspires the idea of how to utilize organic waste biomass into something useful for plant growth and reduce the accumulation of excessive waste and odor that is not delicious for the people of Surabaya. By implementing the appropriate technology to utilize waste biomass of organic waste into a material of burial or organic fertilizer after through the process of composting or fermentation to become organic fertilizer that is beneficial for plants. The purpose of this research is to know the influence of organic waste biomass from the results of the posting of urban organic waste against the growth test and the results of mustard crops.

Based on the research results, it can be concluded as follows:

1. There is a significant influence of the composition of urban garbage organic fertilizer against the growth parameters and results of the mustard crops in the variables studied, including: length of the plant, the number of leaves, the length of the roots and fresh weight per plant.
2. The value of fresh weight yield per highest crop is achieved by P3 treatment (15% from the weight of planting media) by 313.82 grams and effective and efficient treatment, it is also supported by growth variables such as plant length, number of leaves and root length; Even though statistically different P3 treatments are not significant with the P5 treatment (25%) and P7 (35%).

Keywords: organic waste Biomas, mustard greens.

INTRODUCTION

Surabaya's urban environment that produces many organic waste has the impact of excess accumulation in the form of organic waste heap derived from the seresah falling leaves, market garbage, household waste and some other organic waste. This potential inspires the idea of Surabaya city government to do serious waste handling in order to utilize this waste biomass into something useful in the form of organic compost for crop growth and reduce the accumulation of excessive

waste and odor that is not delicious for urban communities (Pratiwi, Huda, & Gunawan, 2017).

Sawi is not a native Indonesian plant, but has a match to the climate, weather and land so it is developed in Indonesia. The mustard plants can grow in both hot and air-conditioned places, so that they can be cultivated from lowlands and highlands. Even so in fact the results are better obtained on the plateau. The suitable planting area is ranging from a height of 5 meters up to 1,200 meters above sea level.

However, it is usually cultivated on an area that has an altitude of 100 meters to 500 meters above sea level. The sago plants are resistant to rainwater, so it can be planted throughout the year. In the dry season you should be aware of regular watering. Due to the growth of this plant requires a mild cold and will grow faster when planted in a humid atmosphere. However, this plant is also not pleased with water that is flooded. Thus this plant is suitable when planting at the end of the rainy season. Soil that is suitable for cultivation of sawi is loose soil, many contain humus, fertile, and water disposal is good. The degree of packaging (pH) of optimum soil for growth is between pH 6 to pH 7 (Dani, 2010).

According to the Directorate of Nutrition Health Department of RI 1979 that the content of nutrients in 100 grams of Sawi, namely: proteins (2.3 grams), fats (0.3 grams), carbohydrates (4.0 grams), Ca (220 grams), P (38.0 grams) Fe (2.9 grams), vitamin A (1940, 0 grams), vitamin B (0.009 grams), vitamin C (102 grams). The benefits of Sawi are very good to relieve the itching in the throat in the cough sufferers. Healers of head diseases, blood cleansing agents, improve renal function, and repair and facilitate digestion. While the content contained in the Sawi are proteins, fats, carbohydrates, Ca, P, Fe, Vitamin A, Vitamin B, and Vitamin C (Dani, 2010). Furthermore, according to Eko Susanto (2010), that Sawi contains many vitamins and minerals. The levels of vitamin K, A, C, E, and folate in the Sawi belong to the excellent category. The minerals in the Sawi that belong to the excellent category are manganese and calcium. Sawi is also excellent in terms of tryptophan amino acids and food fibre (*dietary fiber*).

The use of organic fertilizer in the composition of planting media as well as fertilizer that is very beneficial for increasing agricultural production of both quality and quantity, reduce environmental

pollution, and improve the quality of land sustainably. The use of organic fertilizer in the long term can increase land productivity and can prevent land degradation. Source of material for organic fertilizer is very diverse, with physical characteristics and chemical/nutrient content that is very varied so that the influence of the use of organic fertilizer against land and plants can vary.

Organic matter also serves as an energy source and food microbial soil so as to increase the microbial activity in the provision of plant nutrients. So the addition of organic materials in addition as a source of nutrients for plants, as well as a source of energy and nutrients for microbes (Haryanta, Thohiron, & Gunawan, 2019). The use of organic fertilizer only, can not increase crop productivity and food security. Therefore, integrated nutrient management system that combines the provision of organic fertilizer/biological fertilizer and inorganic fertilizer in order to increase land productivity and environmental sustainability needs to be encouraged. Only in this way the sustainability of crop production and environmental sustainability can be maintained. Agricultural systems called LEISA (*Low external input and sustainable agriculture*) using a combination of organic and inorganic fertilizers based on the concept of *good agricultural practices* should be carried out so that the land degradation can be reduced in order to maintain environmental sustainability.

Thereby, organic fertilizer can improve the physical, chemical and biological properties of soil and increase crop production. Organic fertilizer can be used in all kinds of plants, such as vegetables, fruit, ornamental plants, plantations and crops because of its nature is not toxic and does not cause environmental pollution (*Go Green*) (Chanakya, Srikumar, Anand, modak, & Jagadish, 1999).

This condition that inspired this from urban environment can be optimally strengthened to be used as compost that is beneficial for plant growth and development. Organic fertilizer is one type of fertilizer that can be used to increase the production of agricultural crops, because it contains a complete nutrient elements both macro and micro elements as a result of the reshuffle of organic compounds natural ingredients that contain active and safe living cells of the environment (Gunawan & Wicaksono, 2017).

The use of organic fertilizer developed to support the development of environmentally friendly agriculture, suppress the use of chemical fertilizers and pesticides with natural systems that can eventually increase soil productivity, reduce production costs and produce food that is free of chemicals so clean and healthy for consumption (Purwanti, Gunawan, & Yulianto, 2018). The results of this research activity can be a community devotion activity in the effort to empower the land of urban communities with the cultivation of vegetable plants that are beneficial to the improvement of family nutrition.

This research aims to determine the influence of organic waste biomass from the results of composting the most effective and efficient urban organic waste against the growth test and the yield of Sawi pakchoy crops (*Brassica rapa L.*) So it is expected to know the composition of organic materials that are optimal to increase the growth rate and yield of the mustard crop.

research that by utilizing organic waste

RESEARCH METHODS

This research uses the group Random Plan (RAK), where the treatment uses one (1) factor that is the composition of organic fertilizer (P) consists of 8 treatments and repeated 3 times with each treatment there are 2 sample plants, thus obtained 24 treatment. As for the treatment of composition of compost fertilizer, by comparison: P0 = 0%, P1 = 5%, P2 = 10%, P3 = 15%, P4 = 20%, P5 = 25%, P6 = 30% and P7 = 35% of the weight of planting media. Experimental materials include seeds of sawi pakchoy plants, while as a planting medium used soil and organic fertilizer as a result of composting of the urban Community environment that is subsequently placed in the polybag.

As for the plant observation parameters include: length of the plant (cm), number of leaves, length of the roots, fresh weight of the plant (gram). Use of variety analysis with Test F, to determine the treatment of the study is significant; While to know the difference of each treatment used the BNT test (the smallest real difference) with a level of 5%.

RESULTS AND DISCUSSION

Crop length

The results of statistical analysis showed that the treatment of organic fertilizer composition of urban waste gives a significant effect on the long variable of the mustard plant. The next graph showing the pattern of the long observation value of the mustard plants, presented below.

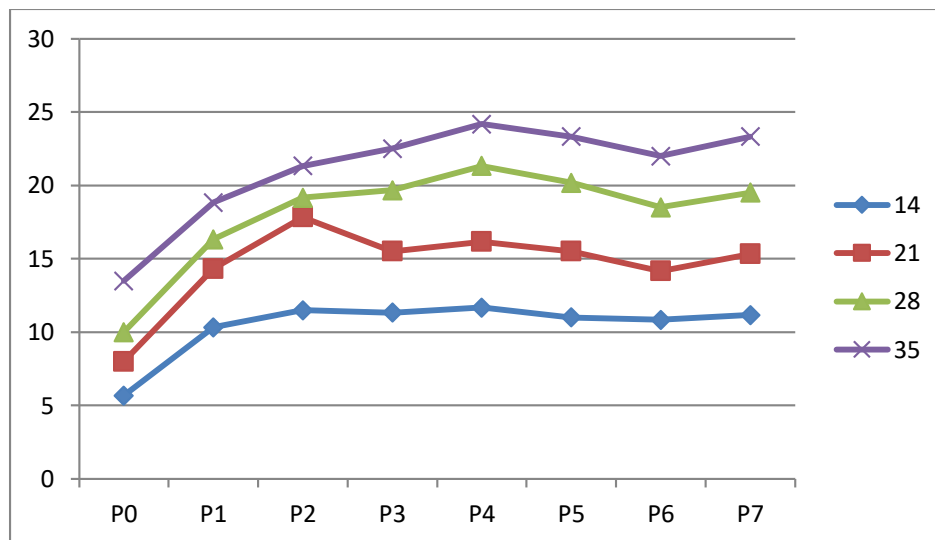


Chart 1. Long value patterns of Sawi plants at various age observations.

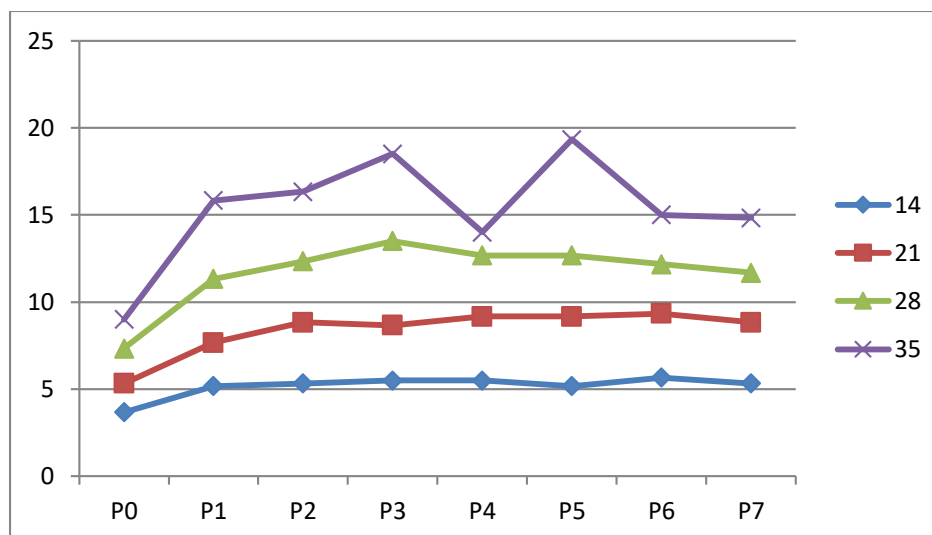
On chart 1 above shows that the P4 treatment gives a better value of 24.17 cm than the other treatment, although it differs not real with the treatment of P3, P5, P7 on the observation age 35 days after planting.

Biomass organic waste added to the planting media also serves as a source of energy and food microbial soil so as to increase the microbial activity in the provision of plant nutrients. The use of organic fertilizer in the long term can increase land productivity and can prevent land degradation. Source of material for organic fertilizer is very diverse, with physical characteristics and chemical/nutrient content that is very varied so that the influence of the use of organic fertilizer against land and plants can vary. Thereby, organic fertilizer can

improve the physical, chemical and biological properties of soil and increase crop production. Organic fertilizer can be used in all kinds of plants, such as vegetables, fruit, ornamental plants, plantations and crops because of its nature is not toxic and does not cause environmental pollution (*go green*).

Number of Leaves

The results of statistical analysis showed that the treatment of organic fertilizer composition of urban garbage has a significant effect on the variable number of the Sawi plants. The next graph that shows the pattern of the variable observation of the number of Sawi plant leaves, presented below.



Graph 2. Pattern of the number of plant leaves of Sawi at various age observations.

In table 2 above shows that the P5 treatment gives a better value of 19.33 compared to other treatments, although statistically different is not apparent with the treatment of P1, P2, P3, P6 and P7 are examined at various ages of crop observations.

The Organ of the leaves serves as the main photosynthesis manufacturer during the photosynthetic process, where the photosynthesis results are further important in the growth and formation of plant biomass. Photosynthesis is the process by which carbon dioxide and water with the influence of sunlight and the presence of chlorophyll are transformed into organic compounding that is rich in energy carbohydrates.

Organic material is a component of soil that plays an important role in preserving soil fertility. The role of organic matter is determined by the arrangement and source of organic matter. Soil that is rich in organic materials will be easier to be processed so that productivity is higher compared to the soil that the organic material levels are low, because the results of weathering materials will

produce minerals that are nutrient elements for plants (Haryanta et al., 2019).

Root and wet weight per plant

The results of statistical analysis showed that the treatment of organic fertilizer composition of urban waste has a significant influence on the variable length of the roots and the fresh weight per mustard plant. Graph 3 below on the variable length of the root indicates that the P7 treatment provides a better value of 67.17 cm compared to other treatments, although statistically different is not significant with the treatment of P3 and P5 researched respectively at 57.17 cm and 53.33 cm; While the weight variable is a fresh plant that the P3 treatment provides a better value of 313.82 grams compared with other treatments, although statistically different is not significant with the treatment of P4 and P5 researched respectively of 275.35 grams and 282.32 grams. The next graph that shows the pattern of observations of the variable length of the roots and the fresh weight of the Sawi plant, presented below.

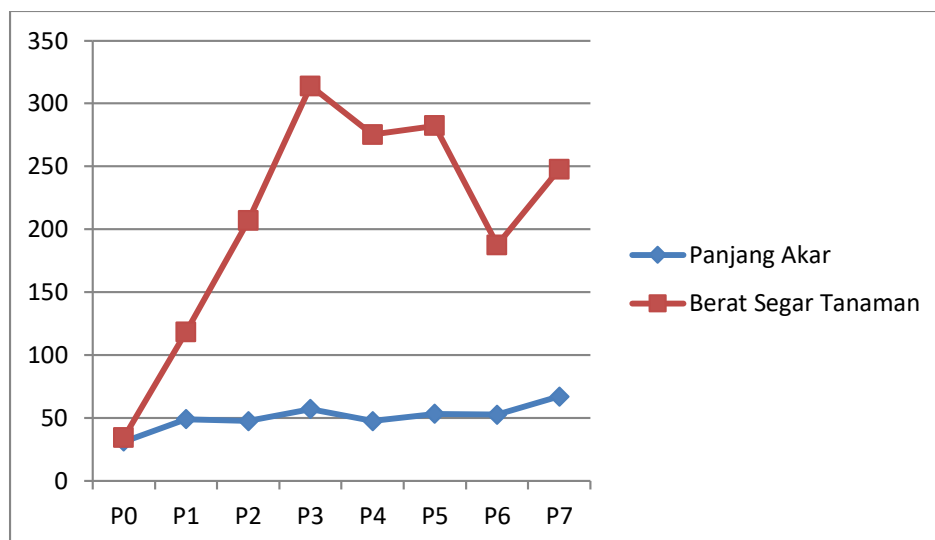


Chart 3. The pattern of the value of the root and fresh weight Per mustard plant at the end of observation (35 HST).

The use of organic fertilizer is able to prevent the Kahat micro elements on the marginal land or soil that has been cultivated intensively with less balanced fertilization; (2) Increase the cation capacity of the soil (KTK); and (3) can form complex compounds with metal ions poisoned crops such as Al, Fe, and Mn.

Urban waste biomass that is processed into compost or organic material can become one component of urban agriculture development that can be part of community self-reliance Force. With the urban farming movement can be an alternative to maintain food security especially the pre prosperous family, so that positively impact in poverty alleviation and foster self-reliance, besides being able to contribute greatly in the provision of green open space in urban areas (Santoso and Widya, 2014).

CONCLUSION

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