

The Effect Of Casgot Fertilizer On The Growth Of Cucumber Plants

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Abstract.

*Regular use of organic fertilizer can improve soil health, reduce erosion, and increase agricultural sustainability by reducing dependence on synthetic chemicals. Kasgot fertilizer or used maggot fertilizer is a type of organic fertilizer produced from maggot droppings (larva lalat Black Soldier Fly) after they decompose organic waste. This fertilizer is rich in essential nutrients such as nitrogen, phosphorus and potassium, and contains various beneficial microorganisms that help increase soil fertility. This research aims to determine the effect of cassava fertilizer on the growth of cucumber plants (*Cucumis sativus L.*). This study used non-factorial RAK with 4 administration dose levels, namely: M0= 0 grams/planting hole, M1= 5 grams/planting hole, M2= 10 grams/planting hole and M3= 20 grams/planting hole. Data were analyzed using analysis of variance tests on the parameters of plant height, number of leaves and root weight. The results of the research showed that the parameters of plant height and number of leaves showed significant differences between plants aged 2 WAP and 4 WAP, while root weight did not have a significant difference between treatments and each replication. Additional doses or other organic materials are needed to increase the macro nutrients available in the soil.*

Keywords: *Cucumber, cashew fertilizer and cucumber plant growth.*

I. INTRODUCTION

Cucumber plant (*Cucumis sativus L.*) is a type of vegetable plant that is widely cultivated in various regions in the world, including Indonesia. This plant comes from the family *Cucur bitaceae* and is known for its oval-shaped fruit with a fresh green color. Cucumbers have a high water content, so they are very refreshing and are often used as salad ingredients, pickles, or even as a health drink [1]. By looking at the potential of cucumbers, cucumber development has very bright business opportunities. The strength of the cucumber market can be seen from the growth and development of industrial companies processing cucumbers into various forms of processed products, such as pickles, pickles, juices and others. With the support of technology and the right marketing strategy, the cucumber business can make a significant contribution to the economy and open up new jobs [2]. In cultivation, cucumbers require warm environmental conditions and fertile soil as well as good drainage for optimal growth [3]. Chemical fertilizers are materials that contain important nutrients such as nitrogen, phosphorus and potassium which are used to increase soil fertility and support growth. plant. Even though its use can provide fast and abundant harvests, continuous use of chemical fertilizers can have various negative impacts.

One of them is a decrease in soil quality, because chemical fertilizers can reduce the organic material content and disrupt the balance of soil microorganisms [4]. In addition, excessive use can cause pollution of groundwater and surrounding waters due to leaching, which has an impact on human health and the ecosystem. The accumulation of chemical residues in plants can also reduce food quality and safety. Therefore, it is important to regulate the use of chemical fertilizers wisely and consider alternatives such as organic fertilizers to maintain agricultural sustainability and environmental health [5]. Organic fertilizer is a natural material derived from the remains of living things, such as compost, manure and green manure, which is used to increase soil fertility and support plant growth. Organic fertilizer contains various important nutrients such as nitrogen, phosphorus and potassium, as well as microelements that are beneficial for plants [6]. In addition, organic fertilizers also help improve soil structure, increase water retention capacity, and support the activity of soil microorganisms that are important for the decomposition of organic matter and nutrient cycling. Regular use of organic fertilizer can improve soil health, reduce erosion, and increase agricultural sustainability by reducing dependence on synthetic chemicals.

With comprehensive benefits, organic fertilizer is the main choice for farmers who want to maintain ecosystem balance and support environmentally friendly agriculture [7]. Kasgot fertilizer, or used maggot fertilizer, is a type of organic fertilizer produced from maggot droppings (*larva lalat Black Soldier Fly*) after they decompose organic waste. This fertilizer is rich in important nutrients such as nitrogen, phosphorus and potassium, and contains various beneficial microorganisms that help increase soil fertility [8]. Cashew fertilizer also plays a role in improving soil structure, increasing water retention capacity, and encouraging healthier and stronger plant growth. Using cassava fertilizer can reduce dependence on chemical fertilizers, reduce organic waste, and support sustainable agricultural practices. With benefits that include increasing crop yields and improving soil quality, cassava fertilizer is becoming an increasingly popular choice among farmers and gardeners who care about the environment [9]. So maggot research on the growth of cucumber plants. It is hoped that the results of this research can provide useful information for farmers and agricultural practitioners in choosing the right organic fertilizer to increase the productivity of cucumber plants naturally and sustainably.

II. METHODS

The research was carried out in Batu Tunggal Village, Na IX-X District, North Labuhanbatu Regency. This research was conducted from January to April 2024. This research used a non-factorial randomized block design (RAK) with 4 dose levels, namely:

M0= 0 grams/planting hole

M1= 5 grams/planting hole

M2= 10 grams/planting hole

M3= 20 grams/planting hole

Each treatment was repeated as many as 10 plants until the total population was 40 plants.

The first step taken is installing the stakes. Stakes are installed in each planting hole on the 4th or 5th day after planting to support the growth of cucumber plants without damaging the roots. Ajir is usually made from split bamboo with a height of around 2 meters. Furthermore, watering is carried out regularly every day until the plants are 2-3 weeks after transplanting. After that, watering can be done every 2-3 days, adjusted to the plant's needs. Apart from that, plant propagation also needs to be done to support the plant so that it grows optimally following the stake. Propagation is done by carefully tying the keajir plants using raffia rope. The propagation process can be started on cucumber plants 10-15 days after planting by tying the stem below the main branch. Apart from propagation, pruning also needs to be done by attaching the shoots to the leaf axils. Pruning is carried out simultaneously with propagation to control the branching so that there are not too many, because excessive branching can affect the size of the cucumber fruit produced. Shoot pruning can be done once a week. Thus, maintaining cucumber plants aims to support optimal plant growth and produce quality fruit.

The parameters observed in this study are as follows:

1. Plant height (cm) was measured using a meter starting from the base of the stem to the tip of the plant's growing point at intervals of once every 2 weeks until it entered the flowering phase.
2. The number of leaves (strands) is counted from the leaves that have fully opened to the oldest leaves at intervals of every 2 weeks until harvest.
3. Root weight (grams) was calculated at the end of the study using a digital scale after the roots were washed and air-dried.

Data analysis

The data analysis used was a statistical test using ANOVA (ANOVA) *analysis of variance* [10]. When there is a real difference in the observed characters, it is tested with Duncan's multiple range test (DMRT) at the level = 0.05% [11].

III. RESULTS AND DISCUSSION

a. Plant height

The results of the research showed that giving cashgot to the height of cucumber plants showed good growth up to the age of 8 WAP, although statistically giving cashgot only significantly affected plant height at the beginning of growth, namely at the age of 2 WAP and 4 WAP, whereas at the age of 6 WAP and 8 WAP of plant height growth did not show significant differences (Table 1). Plant height in the M2 treatment at the age of 6 WAP showed the highest growth, however when entering the age of 8 WAP the plant height showed less growth than the other treatments. The correct dose of cassava must be given so that it can have a good effect on the plants. In this study, it is suspected that the dose given was too little so that the availability of macro nutrients needed by plants to form vegetative cells was not sufficient so that there were no significant differences in each treatment.

Table 1. Data from fingerprint test results for plant height variations

Treatment	Plant Height (cm)			
	2 MST	4 MST	6 MST	8 MST
MO	7,4 _b	35,3 _b	132,6 _a	209,7 _a
M1	10,8 _b	40,9 _a	135,7 _a	207,6 _a
M2	12,2 _a	50,3 _a	142,1 _a	203,6 _a
M3	13,3 _a	44,3 _a	136,1 _a	209,2 _a

Note: Numbers followed by the same letter in the same column are not significantly different according to the Duncan Test at the 5% level.

Purnama Sari stated that cassava stimulates plant cells to divide and elongate more actively, directly supporting an increase in plant height [12]. External factors such as the availability of nutrients in the planting medium have also been proven to play a significant role in optimizing plant growth responses [13]. In particular, the nitrogen (N) contained in cassava fertilizer is the main factor in meeting the needs of cucumber plants in their vegetative phase. This happens because nitrogen is able to encourage cells to increase cell enlargement, thereby influencing the increase in plant height [14]. Suryati *et al.*, revealed that the element N has an important element in being able to stimulate plant vegetative growth, especially in spurring plant height growth [15]. The use of cassava as a nitrogen source provides vital support in ensuring plants get sufficient nutrition to grow optimally. It is known that the N content in cassava is 3.36% [16]. The other contents are water content 41.1%, pH 6.78, N 0.31%, P 1.39%, K 4.42%, C-Organic 17.66% and C/N ratio 56.97 [17].

b. Number of Leaves

The results of the research showed that giving cashgot to the number of leaves on cucumber plants made a significant difference at the beginning of plant growth, namely at 2 WAP and 4 WAP. whereas at 6 WAP and 8 WAP there was no significant effect on all treatment doses given. The number of leaves in treatment M2 showed the highest number of leaves at 4 WAP and 6 WAP, but at 8 WAP the number of leaves was lower than in M1 treatment (Table 2). This research is different from Kusuma's 2014 research in that the number of leaves in the treatments at 6 WAP showed a significant difference, while at ages 2, 4 and 8 did not show a significant difference [18].

Table 2. Results of Leaf Variety Printing Test

Treatment	Number of leaves (pieces)			
	2 MST	4 MST	6 MST	8 MST
MO	3,7 _b	7,9 _b	25,2 _a	38,7 _a
M1	4,2 _a	9,4 _a	24,7 _b	39,4 _a
M2	4,3 _a	10,7 _a	28,9 _a	38,9 _a
M3	4,1 _a	10 _a	28,1 _a	37,8 _a

Note: Numbers followed by the same letter in the same column are not significantly different according to the Duncan Test at the 5% level.

According to [19], cassava organic fertilizer contains 3.4% nitrogen (N) and 2.9% phosphorus (P), and 3.5% potassium (K). Nitrogen plays a crucial role as a component that forms amino acids and phosphorus, which supports the formation of ATP for the activity of new cells in plants. The availability of nitrogen and phosphorus nutrients directly affects the formation of leaves, which are important organs in the

photosynthesis process [20]. Leaf growth and development is strongly influenced by internal factors, which can be modified through engineering soil nutrients as a planting medium [21]. According to Safuan and Andi (2012) the number of leaves and leaf size are influenced by optimal nutrient availability. The nutrient N is able to influence the development of the leaves so that the number of leaves becomes large. This is supported by the opinion of [22], explaining that sufficient availability of N and P can increase the growth of plant organs, one of which is the process of leaf formation. [23], also suggested that apart from increasing plant growth, the N element can also accelerate leaf growth.

c. **Root Weight**

Table 6. Test results of analysis of variance and DMRT of plant root weight

Treatment	Rate rate
M0	5,2a
M1	5.6a
M2	5,7a
M3	5,7a

Note: Numbers followed by the same letter in the same column are not significantly different according to the Duncan Test at the 5% level.

The results of the research showed that there was no significance between the treatments of cassava on plant root weight. The average root weight is only around 5.2 to 5.7 grams. [24], concluded that the use of cassava organic fertilizer is good for plants so that it is able to support growth and increase plant height, as well as being able to improve soil quality because it contains organic material which is rich in nutrients. The organic material contained in cashgot liquid organic fertilizer increases soil fertility, improves the physical properties of the soil, acts as a buffer for the supply of nutrients for plants and has a high water content of 41.1%. Providing optimal nutrition to cucumber plants can provide adequate phosphorus, which will encourage the development of a larger and longer root system. This is reinforced by the use of organic planting media which allows easier root penetration to absorb nutrients, so that root growth is optimal [25]. In research on the effect of cassava fertilizer on cucumber plants, cassava derived from rice waste was proven to improve soil structure and water balance, which supports the development of plant roots. Kasgot fertilizer, with its rich organic material, can improve the quality of air and water in the soil, allowing the roots of cucumber plants to develop well and absorb large amounts of nutrients. Nitrogen, as one of the nutrients contained in cassava, plays an important role in the vegetative phase of plants, contributing to an increase in root weight [26]. With the application of cassava fertilizer, cucumber plants showed a significant increase in root weight, reflecting healthy and strong root conditions, which are essential for overall plant growth and development [27].

IV. **CONCLUSION**

The results showed that there were significant differences in the parameters of plant height and number of leaves at planting ages 2 and 4 WAP, while for root weight parameters there were no significant differences between treatments.

V. **SUGGESTION**

For further research to focus on varying the dose and frequency of cassava fertilizer application to see further effects on root development and other growth parameters. Further research could also consider the effect of cassava fertilizer on physiological aspects of cucumber plants, such as chlorophyll content and photosynthetic efficiency, in order to obtain a more comprehensive picture of the benefits and potential of cassava fertilizer in cultivating cucumber plants. In addition, extending the observation period to the flowering and fruiting phases can provide additional insight into the long-term effects of cassava fertilizer on plant productivity.

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