



Utilization of Kasgot and Eco Enzyme Fertilizer as Nutrient Support to Increase the Growth of White Cooperate (*Brassica Pekinensis* L) of the Tahono Variety in Karo District

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Abstract

Efforts to increase the growth of white mustard plants can be done by providing Kasgot Fertilizer and POC Eco enzyme treatment. If you look at the correct dose, type, time and method of fertilization, the plant's response to fertilization will increase growth and yield. This research was carried out with the aim of determining the effect of plants on the concentration of Kasgot and POC Eco enzyme in white mustard plants. This research was repeated three times using a two-way randomized block design (RAK). The cassava concentration factor (K) has 4 levels, K0 (control), K1 (2 kg/plot), K2 (3 kg/plot), K3 (4 kg/plot). POC Eco enzyme factor (C) consists of 3 levels, namely E0 (control), E1 (20 ml/L), E2 (35 ml/L). Observation parameters include plant height, stem diameter, leaf width for each sample plant. Application of Kasgot Fertilizer had a significant effect on plant height and stem diameter of white mustard plants (3 kg/plot). The administration of POC Eco enzyme had no significant effect on all parameters observed. The interaction of providing Kasgot Fertilizer and POC Eco enzyme had no significant effect on all the treatments observed.

Keywords: Kasgot fertilizer, POC Eco enzyme, Chinese cabbage

1. INTRODUCTION

White mustard greens are a type of leaf vegetable that is favored by Indonesian consumers and contain high levels of pro-vitamin A, ascorbic acid and fiber (Kusuma, 2017). Apart from that, its savory taste makes it the main menu in various vegetable dishes. This can increase the economic opportunities for chicory plants as the number of hotels, restaurants or eateries grows. The high fiber content can help facilitate digestion and can be part of a healthy diet. Nutritious and healthy vegetables are very necessary for the human body.

Mustard greens are a vegetable that is widely consumed by Indonesian people. Apart from its delicious taste, mustard greens contain fiber, vitamins and minerals which are good for body health. Data from the Central Statistics Agency (BPS) shows that mustard greens production in Indonesia reached 727,467 tonnes in 2021. The amount increased

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by 8.99% compared to the previous year which amounted to 667,473 tonnes. Looking at the trend, mustard greens production has tended to increase in the last decade (Hermansyah. et al, [2021](#)).

Growing mustard plants can influence the type of fertilizer used, in general the fertilizer used by farmers is inorganic fertilizer to provide maximum growth for plants, regardless of the impact of inorganic fertilizer application. So, to stop the habit of farmers using organic fertilizer continuously, which has many negative effects, there is an alternative method, namely by using organic fertilizer (Viza, R. Y., [2022](#)).

One of the organic fertilizers that can be used by farmers is cashgot. Kasgot is the residual result of bioconversion carried out by black soldier fly (BSF) fly larvae. Bioconversion is a way of fermenting organic waste using the help of living organisms. BSF fly larvae can break down organic waste which often becomes human waste such as rice, vegetables, fruit and meat so that its use is quite useful for reducing environmental pollution (Kastolani, [2019](#)).

Apart from Kasgot, liquid organic fertilizer is also a type of fertilizer that has been used by farmers for a long time, but excess or insufficient dosage for certain plants is sometimes a factor resulting in less than optimal harvest results. One effort that can be made to reduce the negative impact of leftover household organic materials is making Eco Enzyme. Where Eco Enzyme is a multi-purpose natural liquid that comes from the fermentation of fruit/vegetable waste, sugar and water. Eco Enzyme uses raw materials that are easily available and cheap and the fermentation process takes 3 months which requires patience. However, the resulting solution has many, many benefits. In the fermentation process alone, O₃ gas (ozone) is produced which is needed by the earth's atmosphere (Rubin, [2001](#)). According to Viza, et al ([2022](#)), the many benefits of ecoenzymes include anti-fungal, anti-bacterial, insecticidal agents and cleaning agents. The functions of Eco Enzyme include household cleaning fluid (such as floors, dishes, toilets), vegetable and fruit cleaner, insect repellent and plant fertilizer. The benefits of ecoenzymes as disinfectants are possible because of the alcohol and acetic acid content in the liquid.

The combination of these two fertilizers can also be a solution to maximize the results of cultivating plants, especially white mustard plants. White mustard plants are considered very important to be used as pilot plants because they have high economic value and nutritional content

2. METHOD

This research was conducted on available land at UPt BIH Agriculture Kutagadung, Berastagi District, Karo Regency, North Sumatra. This research was carried out from February to May 2024. The materials needed were white mustard seeds, Kasgot fertilizer and POC eco enzyme. The equipment used is a hoe, measuring tape, rope, ruler, backpack, note-taking tool, stationery, knapsack farming fork and other necessary equipment. This research was carried out using a randomized block design (RAK) with 2 treatment factors, namely, Kasgot Fertilizer (K₀ = control, K₁ = 10 tons/ha, K₂ = 20 tons/ha, K₃ = 30 tons/ha) and POC eco enzyme (E₀ = control, C₁ = 15 L/ha = 15 ml/l, C₂ = 30 L/ha =

(30 ml/l). The parameters observed were plant height (cm), stem diameter (mm), and leaf width (mm). cm).

3. RESULTS AND DISCUSSION

Results

1. Plant Height (cm)

From the results of measuring the average height of the plants which were systematically processed, data from white mustard plants at 14 DAP, from the variance, it can be seen that the concentration of cassava fertilizer and POC eco enzyme had a very significant effect, as well as the interaction of the two treatment factors providing a significant factor in height. white mustard plants aged 6 WAP.

Tabel 1. Average Results of the Effect of Giving Kasgot and POC eco enzyme /1 on the Effect of White Mustard Plant Height (cm) Age 2 WAP

Treatment	E0	E1	E2	Average
K0	242.68	251.67	248.00	247.44
K1	282.33	278.67	279.00	280.00
K2	286.33	308.33	298.00	297.56
K3	318.67	300.00	296.67	305.11
Average	282.50	284.67	280.42	

Based on table two, it can be seen that the K0 treatment (control) has plants with a height of 247.44 cm. Significantly different when compared with treatment K1 (concentration of cassava with a dose of 2 kg/plot) which is 280.00 cm and treatment K2 (concentration of cassava with a dose of 3 kg/plot) which is 297.56 cm and treatment K3 (concentration of cassava with a dose of 4 kg/plot) namely 305.11 cm. Meanwhile, in treatment E2 (POC eco enzyme concentration with a dose of 35 ml/liter) the highest plant average was 282.50 cm and in treatment E1 (POC eco enzyme concentration with a dose of 20 ml/l) it was 1282.50 cm, whereas in treatment E0 (control) shows a slightly different number/1, namely 280.42 cm.

2. Bar Diameter (mm)

From the results of measurements of the average diameter of the stems of the plants, the data were statistically processed at the age of 10 weeks after planting. From the list of variances, it can be seen that the application of cassava fertilizer had a significant effect on plant diameter, but had no significant effect on POC eco enzyme fertilizer, and the interaction of the two treatments on white mustard stem diameter at 6 WAP.

The average test results of the effect of giving cassava with POC eco enzyme on the stem diameter of white mustard plants aged 6 weeks after planting can be presented in table 2 below.

Table 2. Average test results of giving Kasgot and POC Eco enzyme /1 on the stem diameter of white mustard plants (mm) aged 10 weeks after planting

Treatment	E0	E1	E2	Average
K0	715.77	670.63	685.30	690.57
K1	773.93	759.97	756.47	763.46
K2	718.23	744.73	777.53	746.83
K3	748.67	794.43	802.57	781.89
Average	739.15	742.44	755.47	

Based on table two, it can be seen that the K3 treatment (with the administration of cassava fertilizer at a dose of 4 kg) has the highest diameter, namely 781.89 mm, but this is not significantly different from other treatments, while the lowest average is found in the K0 (control) treatment, namely 690.57 (mm). In treatment E2 (with administration of POC eco enzyme at a dose of 35 ml/l) the highest diameter was 755.47 (mm) but it was not significantly different when compared with the other two treatments. Meanwhile, the lowest average was in treatment K0 (control), namely 690.57 mm. Based on table 2 above, it can be seen that the K3 treatment (by administering cassava fertilizer at a dose of 4 kg) has the highest average, namely 781.89 mm, but it is not significantly different when compared with the other averages.

3. Leaf Width (cm)

From the results of measurements of the average leaf width/1 plant, the data were statistically processed at the age of 10 weeks after planting. From the list of variances, it can be seen that the application of cassava fertilizer had a significant effect on the number and number of plants, but had no significant effect on the POC eco enzyme, and the interaction of the two treatments on the width of white mustard leaves at the age of 6 WAP.

The average test results of the effect of giving cassava with POC eco enzyme on the leaf width of white mustard plants aged 6 weeks after planting can be presented in table 3 below.

Table 3. Average test results of giving Kasgot and POC Eco enzyme /1 on the width of leaves of white mustard plants (mm) aged 10 weeks after planting

Treatment	E0	E1	E2	Average
K0	157.33	154.00	164.33	158.56
K1	199.00	189.67	198.00	195.56
K2	244.33	195.33	205.67	215.11
K3	205.33	209.00	210.33	208.22
Average	201.50	187.00	194.58	

Based on table 3 above, it can be seen that the K2 treatment (with 3 kg of cashgot fertilizer) showed the highest value, namely 215.11 cm, but it was not significantly

different when compared to the other three treatments. Meanwhile, the lowest mean was in the K0 (control) treatment, namely 158.56 cm, which is very different from the other treatments. In treatment E0 (control) it has the highest value compared to the other two treatments, however in the POC eco enzyme application it shows quite high values, which we can see in table 3 above.

Discussion

1. The effect of applying cassava fertilizer and liquid caip smoke fertilizer on the growth of white mustard plants

From the results data which were statistically analyzed, it turned out that the application of cashew fertilizer had a significant effect on the parameters of plant height, diameter and leaf width, which had a significant effect on the weight parameters per sample, whereas the application of POC eco enzyme and the interaction between the two treatments showed insignificant results.

In white mustard plants, the dose of cashew increases with increasing plant height and development of white mustard plants, the height of the white mustard plants increases significantly compared to without the application of cashew. Micro and micro nutrient levels, especially nitrogen, potassium, phosphorus play an important role in the growth of roots, stems and leaves.

The increase in the number of leaves and leaf size is part of the process of plant growth and development. The growth and development of trees is influenced by internal factors which can be influenced by humans, namely soil nutrient engineering as a planting medium (Kusuma, [2017](#)). Development and growth can be stimulated by the high content (N) in the soil.

The nitrogen content in cassava comes from organic material broken down by microorganisms which convert ammonia into nitrites. Microorganisms use nitrogen as a food source to form new cells that participate in the decomposition of organic matter (Ratna et al., 2017). Nitrogen nutrients in the form of ammonia are needed by the soil to increase acidity or pH conditions which can support plant growth.

The availability of phosphorus elements in the planting medium is influenced by several factors including dissolved pH, Fe, Al and Mn levels, organic matter levels, microorganism activity, temperature and length of root-soil contact according to (Azmul et al., 2016). Potassium nutrition is used by microorganisms in the substrate material as a catalyst in the presence of bacteria, and its activity contributes to increasing the potassium content (Ayunin et al., [2016](#)).

2. The effect of POC eco enzyme on production in white mustard plants

From the research data that was analyzed, it turned out that the treatment of giving cashgot fertilizer was significant, whereas the effect of giving POC eco enzyme had no real influence on the results of the research data.

This proves that providing sufficient nutrients can increase plant growth, especially in leaf plants (Andrayani et al, [2022](#)). The nutrients in liquid smoke N, P, K can influence the growth of chicory. Nitrogen nutrients help accelerate the vegetative growth of leaves, stems and branches. The P element can increase root growth and the root system because this element is related to the ability of the roots to absorb the nutrient element phosphorus (P) which is sufficient for the formation of new cells or cell division.

In this study it can be stated that the POC eco enzyme treatment is not real because the dosage in this study could be said to be insufficient and the application of POC eco enzyme

once a week is less effective in the karo soil where this research was carried out, it would be better to apply POC eco enzyme at 3 day intervals.

3. The effect of applying cassava fertilizer and liquid caip smoke fertilizer on the interaction of white mustard plants

The results of the research showed that the interaction between the two treatments of cassava fertilizer and liquid smoke fertilizer did not have a significant effect on the parameters of height, stem diameter and leaf width of the plants, however for the treatment outcome parameters K2 (application of cassava fertilizer at a dose of 3 kg/plot) E2 (application of POC eco enzyme with a dose of 35 ml/l) showed the highest. This is thought to occur due to growing environmental factors and the plant itself which causes the nutrients contained in both treatments to contain N, P and K elements which are able to encourage growth and increase the production of white mustard plants. This means that good growth can be achieved if the factors surrounding the plant influence balanced and mutually beneficial growth

Kasgot fertilizer derived from BSF larvae has a positive influence on the physical and chemical properties of the soil and encourages the development of microorganisms. Organic fertilizer derived from maggot or cashgot has a pH of 7.78 and an element N content of up to 3.36%. Providing cassava fertilizer can provide the nutrients needed by plants in the process of forming the vegetative parts of plants, so that the results of photosynthesis can be deposited in plant organs and increase the dry matter of the plant itself.

4. CONCLUSIONS AND SUGGESTIONS

Providing cassava fertilizer has a significant effect on plant height, stem diameter, and persampel leaf width. K2 treatment (cassava treatment with a dose of 3 kg) showed the highest weight in the parameters of plant height and stem diameter of persampel white mustard plants. The administration of POC eco enzyme had no real influence on all the parameters observed. The interaction of cassava fertilizer and POC eco enzyme had no significant effect on all treatments observed.

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