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Utilization of Snails as Liquid Organic Fertilizer (POC) with the Anaerobic Composter Tube Method

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ABSTRACT

Indonesia is a country with thousands of islands inhabited by flora and fauna, with these conditions, many organisms such as snails are found. Snails are often considered pests by vegetable farmers. Snails contain amino acids, nitrogen, phosphorus, potassium, and protein that can help increase plant growth and development. The purpose of this study was to utilize snails as liquid organic fertilizer, to find out the process of making liquid organic fertilizer from snails, to find out the differences in the content of liquid organic fertilizer from the three samples, to find out the comparison of growth in eggplant as a test medium, and to find out the effect of the comparison of molasses and snails. The research methods include preparation of raw materials, boiling and crushing snails, mixing materials, and the fermentation process. After that, the fertilizer from the study was analyzed to determine the content of N, P, K. The results showed that for the analysis of NPK content obtained in a sample of 100 grams of snails, the N content value was 0.028%, P 2 O 5 0.016%, K 2 O 0.003%. In a sample of 300 grams of snails, the N content value is 0.041%, P 2 O 5 0.043%, K 2 O 0.050%. Comparative analysis of purple eggplant plants given snail POC and not given snail POC can be seen the difference in stem height and leaf width. In sample 1 which was not given snail POC, the stem height was 9 cm and the leaf width was 5.4 cm, sample 2 with 100 grams of snails had a stem height of 11.2 cm and a leaf width of 7.1 cm, in sample 3 with 300 grams of snails had a stem height of 12.3 cm and a leaf width of 7.7 cm, while in sample 4 with 500 grams of snails which had a stem height of 15.4 cm and a leaf width of 9.5 cm. This shows that sample 4 with 500 grams of snails has a very good growth rate. The differences in the research test results are due to differences in the dosage or variation and weight of snails and molasses given to each sample.

1. Introduction

Indonesia is a country with thousands of islands inhabited by flora and fauna. This area is a suitable habitat for certain animals or plants so that it has a high level of biodiversity. With such conditions, it is very easy to find organisms such as land snails, slugs, snails, and limpets [1]. One of

the most commonly found animals in various regions in Indonesia is the snail, although this animal is not an Indonesian species but rather a migrant from East Africa [2]. Snails are invertebrates with soft bodies and the gastropoda Class which means walking using their stomachs (body) [3]. Unlike the types of water snails that have gills, snails breathe using lungs so they are included in the order pulmanata [4].

This animal has a high and very fast reproduction rate. Snails really like humid places so that the rainy season is a season that snails really like. In the rainy season, these animals usually start to appear and live by attaching themselves to banana plants and grass. Some people use these animals as animal feed, and are often used as traditional medicine. As for those who ignore these animals because they can cause damage to plants, they are called pests [5].

However, not many people know that snails can be used as liquid organic fertilizer. Fertilizer is one of the main sources of nutrients used for plant growth to meet its nutrient content. Fertilizer contains many nutrients, minerals, and organic materials [6]. The elements needed in fertilizer are C, H, O, N, P, K, Ca, Mg, S. The purpose of giving fertilizer to plants is to improve their physical, chemical, and biological properties [7]. Liquid organic fertilizer from snails is used to fertilize the soil and suppress the growth of pathogens in the soil, so that the effect can increase plant growth and production [8]. Giving liquid organic fertilizer from snail extract is a source of soil nitrogen that plays a significant role in improving soil conditions and as a binder of primary soil grains into secondary grains in the formation of aggregates [9]. The advantages of liquid organic fertilizer are that it can help bind water effectively, can prevent erosion and soil movement, and is easily absorbed by plants [10]

2. Research Methodology

2.1. Materials

The tools used are Composter Tube (Jar), Hammer , Polybag, Blender, Fertilizer bottle, Knife, Small hose, Pan, Ruler, Scales, Container, Name Label, Stationery, and Spoon. The materials used are Snails (Achatina Fulica), Water, Purple Eggplant Seeds, EM4 (Effective Microorganisms), Tomato Waste (As Molasses), Betel Leaves, Rice Washing Water.

2.2. Procedures

1. Raw Material Preparation Stage

900 grams of snails are washed first. Then, prepare 500 grams of tomato waste as molasses. Molasses are obtained by crushing or pounding tomato waste until smooth and mixing it with 100 ml of rice washing water. Then stored in a bottle for 2 to 3 days.

2. Boiling and Destruction Stage

The snails that have been washed are then boiled with 10 medium-sized si rih leaves for about 1 hour to facilitate the crushing process and reduce the smell of snails during the fermentation process. After boiling, the snail meat is blended and the shells are crushed or pounded. With the composition of snail raw materials divided into 3 parts, namely: 100 grams, 300 grams, and 500 grams.

3. Mixing Stage of Materials

After the snails are boiled and crushed, the ingredients are put into a bucket. Put in the tomato waste that has been obtained as molasses as much as 50 ml for a composition weight of 100 grams, 75 ml for a composition weight of 300 grams, and 100 ml for a composition weight of 500 grams, after that add EM4 with a composition of 60 ml for each sample. Then stir all ingredients until evenly distributed.

4. Fermentation Process Stages

The materials that have been mixed and stirred evenly, then put into a composter tube (500 ml jar) then the fermentation process is carried out. This process takes 30 days. After the liquid fertilizer results are obtained, then the fertilizer is tested for its NPK parameters to determine the content of Nitrogen, Phosphorus, and Potassium contained in the liquid fertilizer that has been produced.

5. Results Analysis:

a. Before sowing, the seeds are soaked first into warm water for approximately 15 minutes.
b. Purple eggplant seeding is done in polybags.
c. The seedling medium consists of a mixture of soil and rice husks.
d. Next, the seeds are put into polybags and covered thinly with soil. Watering is done every day.
e. Measure the ratio of stem height to leaf width on eggplant plants twice a week.

3. Results and Discussion

3.1. The Effect of Giving POC on the Growth of Purple Eggplant

Initially, all test media were 7 cm high before being given POC. POC was given after 15 HST in the afternoon so that soil conditioning returned to optimal, and the right time for plants to be given fertilizer. Fertilizer was given twice a week to stimulate growth in purple eggplant. In addition, it is necessary to pay attention to the dosage for fertilizer administration so that the pH acidity level is not too high which can cause plants to rot. For this reason, it is necessary to mix fertilizer and water with a ratio of 1: 2.

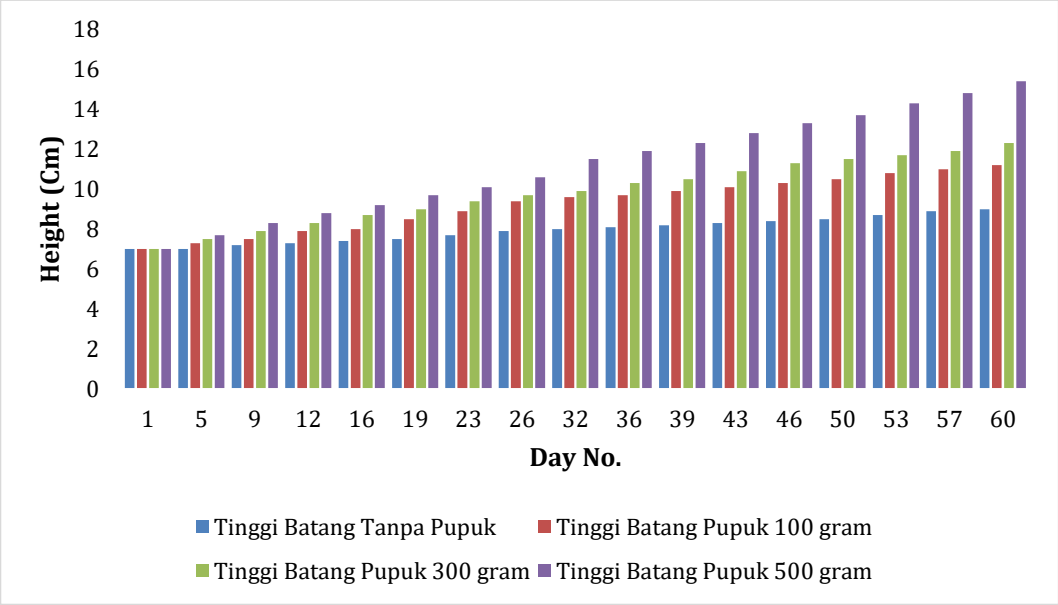

Fig 1. Changes in the Height of Purple Eggplant Stems in Each Fertilizer Sample for 60 Days

Fig 1. above shows that there is a difference in stem height between samples that are given fertilizer and those without fertilizer for 60 days of testing. Sample 1 that is not given fertilizer has a stem height of 9 cm with very low and slow stem height growth compared to the others. Sample 2 with 100 grams of snails has a stem height of 11.2 cm, sample 3 with 300 grams of snails has a stem height of 12.3 cm, and sample 4 with 500 grams of snails has a very good height growth rate with a height of 15.4 cm. This factor is due to the influence of the composition of the dosage of materials during manufacture, in addition environmental factors also affect such as soil, water, light, and nutrients [11].

Fig 2. above shows that there are differences in leaf width in each sample during 60 days of testing. In sample 1 which was not given fertilizer had a leaf width of 5.4 cm, in sample 2 with 100 grams of snails had a leaf width of 4.7.1 cm, in sample 3 with 300 grams of snails had a leaf width of 7.7 cm, and in sample 4 with 500 grams of snails had a very large leaf width of 9.5 cm compared to the others.

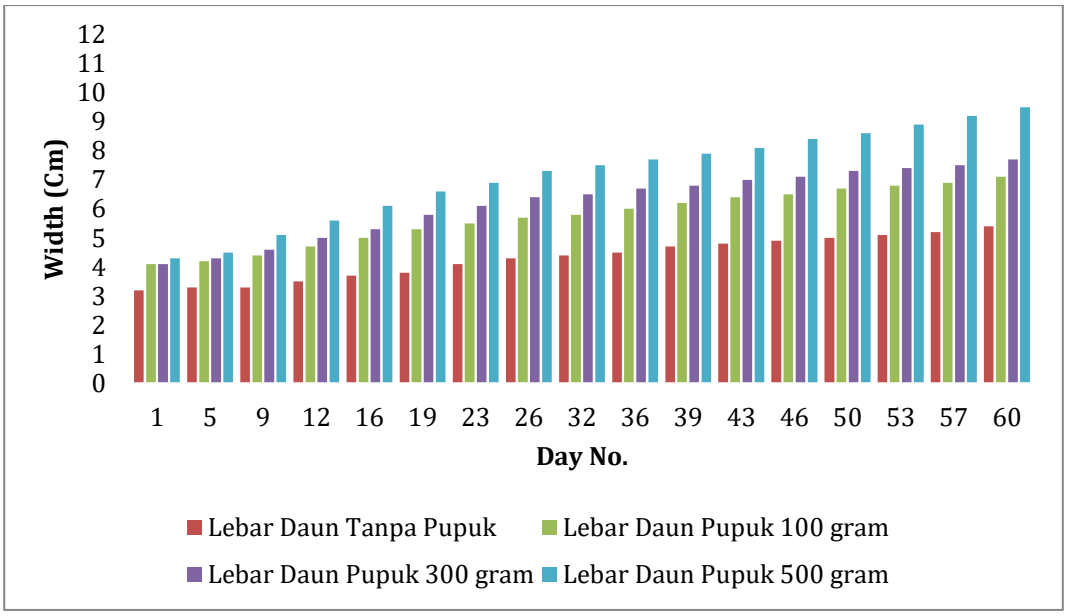

Fig 2 Changes in **the** Width of Purple Eggplant Leaves in Each Fertilizer Sample for 60 Days

3.2. POC Color and Aroma Analysis

Observation of color and aroma in POC was done by organoleptic test, namely using the sense of smell and sight. The results of the observation showed that the fertilizer produced smelled like tape which was very pungent and slightly fishy, and it can be seen that the color of the fertilizer is blackish brown. The change in odor from the fishy smell of snails at 0 weeks to odorless at week four (4) is one of the signs that POC is changing. According to[12]. stated that physical changes in POC involve changes in odor where the odor produced is like the smell of tape. This occurs in several treatments that are carried out, namely in the 4th week the POC has a tape aroma.

3.3. Effect of Snail Variation on POC

In this study, snails were used with different weight variations, namely 100 grams, 300 grams, and 500 grams. So that the variation in the dosage of raw materials can affect the growth rate of purple eggplant with parameters of stem height and leaf width.

Table 1. The Effect of Snail Varieties on the Growth of Purple Eggplant

Parameter	100 grams	300 grams	500 grams
Stem Height	11.2 cm	12.3 cm	15.4 cm
Leaf Width	7.1 cm	7.7 cm	9.5 cm

Fig 3. Comparison of Purple Eggplant Height (Without Fertilizer, 100 grams, and 300 grams **)**

Fig 4. Comparison of Purple Eggplant Leaf Width (Without Fertilizer, 100 grams, 300 grams, and 500 grams)

3.4. Effect of Molasses Variation on POC

In this study, the molasses variations used were 50 ml, 75 ml, and 100 ml. The difference in these measurements can affect the NPK content value in POC. This can be seen from the results of research conducted by [13], which reported that variations in the addition of papaya moles affected the increase in NPK content in tofu waste POC. This statement is in accordance with the results of our research. In addition, it can also cause differences in sugar concentration in POC which can affect the duration of the fermentation process.

Table 2in NPK Content Values

Sample	N	P_2O_5	K_2O
50 ml	0.028 %	0.016 %	0.003 %
75 ml	0.041 %	0.043 %	0.050 %

4. Conclusion

Based on the results of the research that has been done, it can be concluded that the provision of snail liquid organic fertilizer can increase the growth of purple eggplant. Snail variations in POC affect the growth rate of purple eggplant with parameters of stem height and leaf width. In addition, variations in molasses also affect the results of NPK content in POC, the more molasses used, the higher the NPK content value. The results of the NPK value data obtained in a sample of 100 grams of snails were N 0.028%, P_2O_5 0.016%, and K_2O 0.003%, while in a sample of 300 grams of snails, namely N 0.041%, P_2O_5 0.043%, and K_2O 0.050%. The provision of 500 grams of snail POC greatly influenced the growth of purple eggplant with a stem height of 15.4 cm and a leaf width of 9.5 cm during 60 days of testing.

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