EFFECT OF SEAWEED AND FISH WASTE LIQUID FERTILIZER ON PLANT GROWTH OF VIGNA RADIATA IN OVERCOMING THE LIMITATIONS SUBSIDIZED FERTILIZERS IN INDONESIA

E-NNOVATE 2021

CATEGORY: LIFE SCIENCE

Authors:

Alia Raunaqi Najiha

Nur ‘Azmi Dieni Sa’adah

Annisa Nuril Baiti

Siti Shofiyatul Mursyidah Hazamie

SUNAN PANDANARAN ISLAMIC JUNIOR HIGH SCHOOL
JL. KALIURANG KM 12 CANDI, SUKOHARJO, NGAGLIK, SLEMAN, SPECIAL REGION OF YOGYAKARTA

2021

ABSTRACT

Fulfilling the food needs of all people living in each region is the main target of food policy for the government so that it can be fulfilled. Food security is an issue in agricultural development. The use of inorganic fertilizers will have a negative impact on the soil if used for a long time. The objectives of this study were (1) Determine how to make seaweed and fish waste liquid fertilizer and (2) Determine the growth of vigna radiate from the application seaweed and fish waste liquid fertilizer. The research method used was an experiment with the help of qualitative and quantitative data collection techniques. So that the results obtained from this study are that there are innovative products as liquid organic fertilizers which show significant results in the growth of vigna radiata.

Keywords: Fish Waste, Seaweed Waste, Vigna Radiata, Liquid Organic Fertilizer, and Subsidized Fertilizer.

Introduction

Humans need the fulfillment of balanced nutrition to obtain good health. In achieving the fulfillment of balanced nutrition. of course, the nutritional intake of various types of food intake must be considered very much. As is well known, food is a basic need for humans to survive. Also, the Ministry of Agrarian Affairs and Spatial Planning showed that the raw area of rice fields in Indonesia in 2019 is 7.46 million hectares or to be precise 7,463,948 hectares (Bahfein, 2020).

From this data, to improve the quality of agriculture, we need fertilizer. Fertilizers are divided into two, they are inorganic fertilizers and organic fertilizers. However, many farmers use inorganic fertilizers. Based on the 2013 Central Bureau of Statistics Agricultural Census, farmers in Indonesia using inorganic fertilizers reached 86.41 percent. But actually, the use of inorganic fertilizers which give a negative impact in the form of dry land generally uses an inadequate dose. So that currently, organic fertilizers have become a lot of alternative solutions, because they are safe and able to increase agricultural production both in quality and quantity.

Yogyakarta Special Region is one of the regions that produce seaweed. In 2009 it was able to produce seaweed of 474.80 tons. Actually, from the seaweed found, there must be discarded seaweed. Seaweed can be used as an organic fertilizer because seaweed contains lots of minerals and also substances such as auxins, cytokinins, and gibberellins which are useful for spurring growth and increasing plant production.

Apart from the used seaweed waste, the unused fish waste can be used to be used as liquid organic fertilizer. Fish waste contains various nutrients, namely N (Nitrogen), P (Phosphor), K (Potassium) which are components of organic fertilizer.

Research Methods and Approaches

The research method used was an experiment. The research was carried out in the MTs Sunan Pandanaran laboratory and research house from 1 January until 13 March 2021. The independent variables in the research was variations in liquid organic fertilizer formulations from seaweed and fish waste. The dependent variable was the effectiveness of fertilizers on the growth of vigna radiata. The control variables were the size of the polybags, the amount of water in the delivery of plants, and the location of light receiving.

The making process of the fertilizer consists are determination of the composition of the organic fertilizer to be made consisting of seaweed and fish waste. The composition of the fertilizers consisted of 5 compositions with a composition of 0 grams as a control. After that, the seaweed and fish waste obtained is sorted first with running water. Preparation of one gram of vigna radiata seeds and immersed in water for two nights to break seed dormancy. Make liquid organic fertilizer with a composition ratio of 1 bottle 200 ml of seaweed waste: 0 ml of fish waste. until the fifth bottle, mixed with a ratio of 0 ml of seaweed waste: 200 ml of fish waste. Plant the seeds in polybags filled with soil. Place the poly bag containing the seeds in a place with the same light intensity. Measure the height of the plant every day for 7 days. Each plant from each concentration was compared with stem height, number of leaves, and root length.

Results and Discussion

The results obtained from the use of seaweed waste fertilizers and fish waste are:

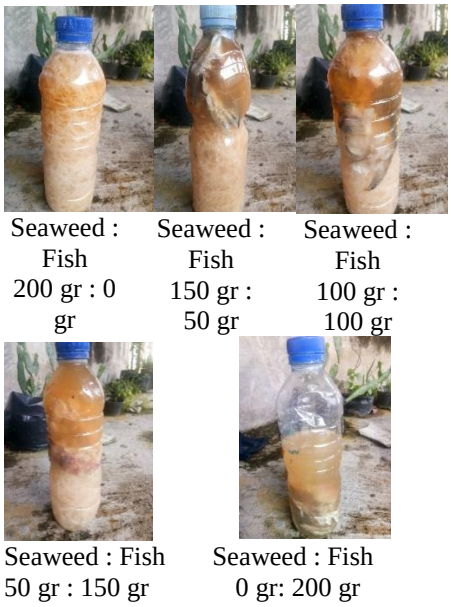

Figure 1. Comparison of seaweed and fish

In the making process of fertilizer, the Seaweed liquid fertilizer is produced by extracting the liquid contained in seaweed by fermenting the seaweed in a tank by adding fermentation bacteria in the form of EM-4. Whereas in the processing of fish waste, which previously consisted of various types of fish mixtures in the form of bones, skin fins, and guts or offal. Then, it is done chopping and soaking the seaweed that has been made previously. As for the formulation of combining seaweed and fish waste extracts with a ratio of 200 ml: 0 ml, 150 ml: 50 ml, 100 ml: 100

ml, 50 ml: 150 ml, and 0 ml: 200 ml stir the liquid with a tool so that it can be evenly mixed. Finally, the liquid fertilizer is fermented for 1 day.

Based on the results of observations, the growth of polybags C0 which did not use fertilizers at all, the average growth produced was 3.96 cm. In addition, for C1 that uses fertilizer with a ratio of 200 gr: 0 g of seaweed waste and fish, the average yield is 5.1 cm. At C2 with the use of fertilizer at a ratio of 150 grams of seaweed waste: 50 grams of fish has an average growth rate of 5.39 cm. In the C3 variation with a ratio of 100 gr: 100 gr has an average growth rate of 4.72 cm, and while for C4 with a ratio of 50 grams of seaweed waste: 150 grams of fish has an average of 5.37 cm, and at C5 with a ratio of 0 ml of waste seaweed: 200 ml of fish has an average growth rate of 4.13 cm.

If observed from the aspect of profit, the resulting price of production per package is IDR 30,000 per 500 mL, with a total of 10 bottles. The total cost required is Rp. 118,000, -. It can be predicted that the result, the gross income from the seller is Rp. 300,000 and the resulting profit is Rp. 182,000.

So in this case it shows that producing seaweed and fish waste fertilizer can also be used as business capital to improve the community's economy.

Conclusion

The method of making fertilizer is starting from the stage of preparing the tools and materials, cleaning the materials to be used, drying. Then soak the seaweed waste to get the waste extract, then put the waste into the first bottle and some of the waste is mixed with fish in the second bottle.

Fertilizer with seaweed and fish waste extract is effective in plant growth. The best composition in composition two is the use of fertilizer at a ratio of 150 grams of seaweed waste: 50 grams of fish has an average growth rate of 5.39 cm.

Bibliography

Adawyah, R., 2014. Pengolahan Dan Pengawetan Ikan, Jakarta: PT. Bumi Aksara.

Basmal,J.(2009). Prospek Pemanfaatan Rumput Laut Sebagai Bahan Pupuk Organik. Squalen Bulletin of Marine and Fisheries Postharvest and Biotechnology, 4(1), 1.

Ghazali, M., Aryanti, E., Kurnianingsih, R., & Sunarpi, S. (2019). Pemanfaatan Ekstrak Rumput Laut Sebagai Pupuk Organik Pada Pertanian Lahan Sempit Di Desa Lepak Lombok Timur. Jurnal Pengabdian Magister Pendidikan IPA, 1(1).

Nur, H., & Tjatoer, W. (2011). Pemanfaatan Limbah Ikan Menjadi Pupuk Organik. Envirotek : Jurnal Ilmiah Teknik Lingkungan, 3(1).

Sedayu, B. B., Erawan, I. M. S., & Assadad, L. (2014). Liquid fertilizer from Eucheuma cottonii, Sargassum sp, dan Gracilaria sp. using composting process. JPB Perikanan, 9(1), 61–68.