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Trichoderma Compost Making Technology in the Bumi Sari Farmers Group of Bongkasa Village, Abiansemal District, Badung Regency, Bali Province

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A B S T R A C T

Bumi Sari Farmers Group is located in Abiansemal Village, Badung. This group of 10 members manages chilli plantations. The problem faced by the Bumi Sari Farmers group is that chili plants often experience symptoms of permanent wilting, and fruit rot attacked by pathogenic fungi. Trichoderma compost is a solution to overcome this problem. With the concept of controlling plant pest organisms (OPT) naturally, to get healthy plant cultivation and be free from diseases. In this activity, the farmer group has been able to make Trichoderma compost and has applied it to chilli plants. From the survey results, the damage to chilli flowers reached 75%. Furthermore, after the application of Trichoderma compost fertilizer treatment, it suppressed diseases in chilli plants by 46.4%. From this activity, it was able to reduce yield loss by 25% and increase farmers' income by 20%.

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1. INTRODUCTION

1.1. Research Background

Until now, many quality organic fertilizers have been developed from the results of technological innovations by utilizing waste that pollutes the environment into organic fertilizers complete with macro and micro elements that can be directly used by plants. The results of the study show that organic materials/fertilizers are biological buffers that have a function in improving the physical, chemical and biological properties of the soil so that the soil can provide a balanced amount of nutrients. The most practical improvement in soil fertility conditions is by adding fertilizer to the soil. However, it is necessary to pay attention to the balance of soil fertility so that the fertilizer provided can be effective and efficient. The addition of inorganic fertilizers that provide ready-to-eat mineral ions alone will damage the physical fertility of the soil, where the soil becomes hard and compact. Thus, the application of organic fertilizers will greatly improve soil conditions [1]. However, organic fertilizers are slower to decompose into mineral ions, especially if the application is only in the form of adding raw organic matter. Therefore, the content of soil microorganisms also needs to be enriched to accelerate decomposition, so that soil fertility can be maintained [2].

One of the functional microorganisms that is widely known as soil biological fertilizer is the fungus Trichoderma sp [3]. Trichoderma sp. Besides being a decomposing organism, it can also function as a biological agent and plant growth stimulator [4]. Some species of Trichoderma sp. have been reported as biological agents such as T. Harzianum, T. Viridae, and T. Konigii which are broad-spectrum in various crops [5]. Cultures of the fungus Trichoderma sp. were given to the planting area and acted as a decomposer, decomposing organic waste (falling off old leaves and twigs) into quality compost [6]. In addition, it can also be applied as a biofungicide, which plays a role in controlling pathogenic organisms that cause plant diseases. Trichoderma sp. can inhibit the growth of several disease-causing fungi in plants, including Rigidiforus lignosus, Fusarium oxysporum, Rizoctonia

solani, Sclerotium rolfsi [7]. In addition to its ability as a biological controller, Trichoderma sp. It has a positive influence on plant roots, plant growth, and plant production. This property indicates that Trichoderma sp. acts as a Plant Growth Enhancer [8].

Bongkasa Pertiwi Village has an area of 157 hectares with a population of ±2,504 people. Bongkasa Pertiwi Village is an area that includes a plateau with an altitude of 312 m above sea level, with a humid tropical climate with rainfall of almost 2000-3000 mm/six months with an average regional temperature of 30-350 C. Bongkasa Pertiwi Village consists of three banjars, namely Karang Dalem I, Karang Dalem II, and Tegal Kuning. Bongkasa Pertiwi Village. Bongkasa Pertiwi Village has natural potential, rivers and green agricultural land, therefore most of the people work in the agricultural and tourism sectors. Bongkasa Pertiwi Village, Abiansemal, Badung is Bongkasa Village is a village which has great potential in agriculture and livestock. Bumi Sari Farmers Group is located in Abiansemal Village, Badung. This group of 10 members manages chilli plantations.

The problem faced by the Bumi Sari Farmers group is that chili plants often experience symptoms of permanent wilting, fruit rot attacked by pathogenic fungi. The Farmer Group does not know the right technology for the control of wilt and fruit rot in chili. The group experienced the problem of the growth of pathogenic fungi that cause disease in plants, so it is necessary to find a solution to overcome this. Trichoderma compost is a solution to overcome this problem. With the concept of controlling plant pest organisms (OPT) naturally, to get healthy plant cultivation and be free from diseases (especially plant diseases caused by pathogenic fungi) we can use Tricho Compost fertilizer. This fertilizer is a fertilizer made by utilizing biological agents in the form of Trichoderma sp. in the mixture. Tricho Compost fertilizer has many benefits, namely, it can prevent/reduce diseases that spread from and in the soil, improve soil structure and texture and improve soil quality and fertility. Other uses of Trichoderma compost fertilizer are soil amendment, maintaining soil microbial balance, nourishing plants, controlling soil-borne pathogens and fertilizing soil [8]. Based on the results of the study, Trichoderma compost can suppress pathogenic fungi by 98.53% [9].

Figure 1. Condition of Chili Peppers in the Bumi Sari Farmer Group

1.2. Research Objective

The objective of this research is to evaluate the impact of Trichoderma compost on reducing yield losses in chilli plants affected by diseases and to study the increasing farmers' income.

2. MATERIALS AND METHODS

The activity will be held at the Bumi Sari Farmers Group. The method of implementing PKM activities on Trichoderma compost-making technology is using interviews, face-to-face (counselling) and direct practice. Interview and discussion methods to be able to find out the problems experienced by partners. Face-to-face method and providing direct counseling, so that partners gain knowledge about how to make Trichoderma compost fertilizer and its application to chili plants. Direct practice, is guided by instructors who are competent in their fields so that partners can directly apply the methods provided. The direct practice carried out is the manufacture of Trichoderma compost and how to apply it to chilli plants.

The procedure for making Trichoderma compost fertilizer is carried out with the following steps as shown in Figure 2. The finished Trichoderma compost fertilizer is then applied to chilli plants. The easiest application of Trichoderma is by making rich compost and then given to the plant, the dose is adjusted to the type of plant being cultivated.

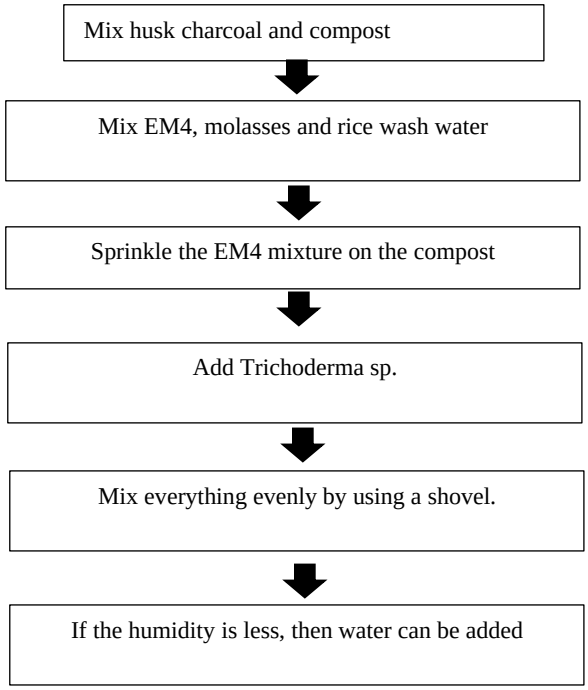

Figure 2. Working procedure for making Trichoderma compost fertilizer

3. RESULT AND DISCUSSION

The community partnership program activities were carried out at the Bumi Sari Farmers Group, Bongkasa Village, Abiansemal District, Badung Regency, Bali Province. The activity began with counselling on Trichoderma compost-making technology. Furthermore, the practice group immediately made Trichoderma compost. After that, fertilizer is applied to chilli plants.

Figure 3. Counselling activities and handover of assistance for making Trichoderma Compost Fertilizer

Figure 4. Ingredients for making Trichoderma compost
(Trichoderma sp. seeds, rice washing water, husk charcoal, EM4, Molasis and manure)

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Figure 5. The practice of Making Trichoderma Compost

Trichoderma compost fertilizer is an organic fertilizer that contains the antagonist fungus Trichoderma sp. Trichoderma functions as a decomposer of organic matter and at the same time as a controller of soil-borne diseases such as *Sclerotium sp., Phytium sp., Fusarium sp., Phythopthora sp.,* and *Rhizoctonia sp*. [5]. Trichoderma compost is very effective as a soil loosener and plant fertilizer, accelerating the growth of seedlings, flowers, and fruits. Trichoderma compost can prevent and control attacks of soil-borne plant diseases [6][7][8]. Trichoderma compost fertilizer serves as a biological agent and plant growth stimulator, improving soil quality and plant fertility [9][10][11]. Trichoderma has advantages compared to inorganic fertilizers, namely it also contains micronutrients Trichoderma compost fertilizer contains Trichoderma sp. Trichoderma sp fungus is a type of fungus that is beneficial to humans [12]. Trichoderma sp is effective in controlling mace root disease in caisin plants. Trichoderma sp. as a biological agent can increase plant growth [13] [14].

The productivity of chilli peppers has not been optimal, among other things, due to the high number of pest and disease attacks that can economically reduce productivity. Plant pathogens are an important problem in the cultivation of chilli plants. Some important diseases in chilli peppers include fusarium wilt caused by Fusarium oxysporum, this symptom makes many fruits fall when approaching harvest time. Chili fruit rot caused by Colletotrichum sp, This disease has symptoms of impotence that continue to the lower part of the plant, leaves, twigs and branches become dry and blackish-brown. Leaf spot disease is caused by Cercospora capsici, and branch rot disease is caused by Phytophthora capsica [15].

Wilt disease in chilli peppers is a problem for farmers, so the PKM team provides a solution for using Trichoderma compost. Ref. [16] reported that Trichoderma can increase the growth and yield of chilli plants by inhibiting the growth of pathogenic fungi.

This community service program provides benefits to partner groups, especially partners who have been able to make Trichoderma compost and apply it to the cultivation of chilli flower plants. From the survey results, the results of chilli flower damage due to disease reached 75%. Furthermore, after the application of Trichoderma compost fertilizer treatment, it suppressed diseases in chilli crops by 46.4%. From this activity, it can reduce yield loss by 25% and increase farmers' income by 20%. Partners hope to receive continuous assistance in the manufacture and application of Trichoderma compost fertilizer on chilli plants. The production of chilli plants produced by the group increases and produces healthy chilli plants so that the selling value is higher.

4. CONCLUSION

The Community Partnership Program activities carried out in the Bumi Sari Farmers Group have been running smoothly. From the survey results, the result of chilli damage reached 75%. Furthermore, after the application of Trichoderma compost fertilizer treatment, it suppressed diseases in chilli plants by 46.4%. From this activity, it was able to reduce yield loss by 25% and increase farmers' income by 20%.

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