AJARCDE
ASIAN JOURNAL OF APPLIED RESEARCH FOR COMMUNITY DEVELOPMENT AND EMPOWERMENT

Journal home page: http://ajarcde-safe-network.org ISSN 2581-0405

The Utilization of Technology in the Production of Trichocompost Fertilizer and its Subsequent Application to Chrysanthemum Plants at the Pudak Lestari Agro Ornamental Plant Farmer Group

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ARTICLE INFO

Article History:
Received: 29 September 2023
Final Revision: 26 October 2023
Accepted: 30 October 2023
Online Publication: 30 October 2023

KEYWORDS

Trichoderma, Trichocompost Chrysanthemum, White Rust Disease

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A B S T R A C T

The ornamental plant farmer group Agro Pudak Lestari has long cultivated chrysanthemums. In the cultivation of chrysanthemums, the Agro Pudak Lestari farmer group experienced several obstacles, namely yields that did not meet market criteria caused by white rust disease. Antagonistic microorganisms Trichoderma sp. Effectively control white rust disease. White rust disease is a soil infectious disease so countermeasures are carried out by making compost containing biological agents Trchoderma (Trichocompost fertilizer). From the survey results, the results of flower damage due to rust disease reached 80%. Furthermore, after the application of Trichocompost fertilizer treatment, it suppressed rust disease by 56.4%. From this activity, it was able to reduce yield losses by 23.4% and increase farmers' income by 28.2%. The use of Trichocompost fertilizer can overcome white rust disease in chrysanthemum plants so it can increase farmer productivity.

1. INTRODUCTION

1.1. Research Background

Chrysanthemum is one type of ornamental flower that is popular in Indonesia. The attractive color of flowers and flower shapes, as well as having many types make them liked by many people [1]. However, this plant is very susceptible to rust disease caused by the fungus Puccinia horiana which is the main disease in chrysanthemums. Although not deadly to plants, fungal infections will reduce the health and strength of plants so that they affect the production and quality of flowers, and reduce the aesthetic value of chrysanthemums due to the presence of pustules (rust).

Pancasari Village, Sukasada District, Buleleng is a highland area and is a producer of cut chrysanthemum flowers in Bali with a land area of 7.16 Ha. Based on ornamental plant production data obtained from the Buleleng Regency Agriculture Office, the total production of chrysanthemums in 2017 in Pancasari Village, Sukasada District was 184,800 stalks. The ornamental plant farmer group Agro Pudak Lestari has long cultivated chrysanthemums. In the cultivation of chrysanthemums, the Agro pudak lestari farmer group experienced several obstacles, namely crops that did not meet market criteria due to white rust disease.

Trichoderma sp. is one type of antagonistic fungus that can be used as a biological fungicide for plants. This fungus has been widely tested for its effectiveness in controlling plant pathogenic fungi. Ref. [2] reported the fungus Trichoderma sp. is an antagonistic agent that is quite effective for inhibiting the development of the pathogen Fusarium oxysporum which is the cause of wilt disease in chrysanthemum plants. In addition, this fungus is also able to provide plant nutrients needed to support the growth of vegetative and reproductive organs through the

decomposition process of organic matter given to the growing media. [3] reported that the antagonistic microorganism Trichoderma sp. effectively controls white rust disease by 17.71 %.

White rust disease in chrysanthemums can spread through the initial inoculum present in the soil. Therefore, countermeasures are carried out by making compost containing Trichoderma biological agents (Trichocompost fertilizer). Trichocompost fertilizer has many benefits, which 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 are soil improvement, maintaining soil microbial balance, nourishing plants, controlling soil infectious pathogens, and fertilizing the soil [4].

Therefore, the Faculty of Agriculture, Warmadewa University carries out community service with the Department of Science and Technology, Central Bicol State University of Agriculture, Philippines, in the form of training and public education on Trichocompost making technology and its application to chrysanthemum plants in the Pudak Lestari Agro Ornamental Plant Farmer Group. This activity is considered very necessary, especially because of the ability of Trichoderma sp as a controller of pathogenic fungi that cause rust disease in chrysanthemum flowers and can be applied in compost to overcome the problem of rust disease in chrysanthemum plants.

2. MATERIALS AND METHODS

The activity has been carried out at the Pudak Lestari Agro Ornamental Plant Farmer Group in Pancasari Village, Sukasada District, Buleleng Regency. The method of implementing PKM activities is the technology of making Trichocompost fertilizer and its application to chrysanthemum plants, namely using interviews, face-to-face (counseling), and direct practice. Interview and discussion methods to be able to find out the problems experienced by partners. Face-to-face method and provide direct counseling, so that partners gain knowledge about how to make Trichocompost fertilizer technology and its application to chrysanthemum plants. Direct practice, is guided by instructors who are competent in their fields so that partners can apply directly the methods provided. The direct practice carried out is making Trichocompost fertilizer and applying it to chrysanthemum plants

The procedure for making Trichocompost fertilizer is carried out by the following steps as in Figure 1. The finished Trichocompost fertilizer is further applied to chrysanthemum flower plants. Giving Trichoderma is easiest by making trichocompost and then giving it to plants, the dose adjusts to the type of plant cultivated. In chrysanthemum flower plants, the dose given is 10-20 tons/ha.

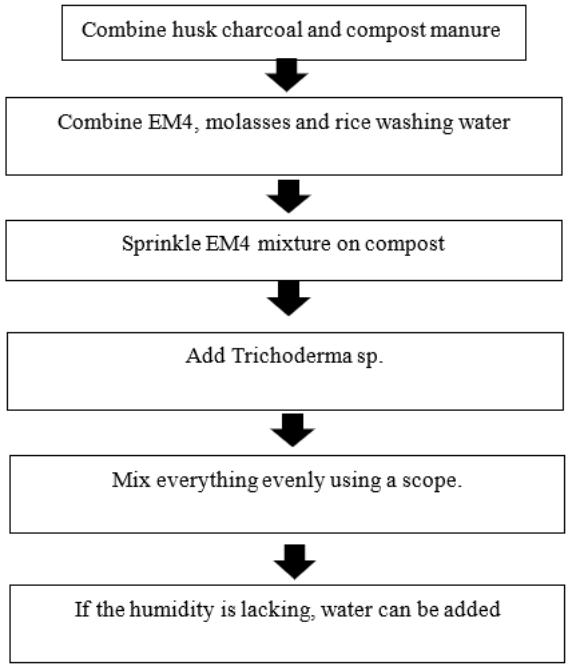

Figure 1. Working procedure for making Trichocompost fertilizer

3. RESULT AND DISCUSSION

Community service activities will be carried out at the Pudak Lestari Agro Ornamental Plant Farmer Group in Pancasari Village, Sukasada District, Buleleng Regency. The activity began with counseling on the technology of making Trichocompost fertilizer and its application to chrysanthemum plants. Furthermore, the practice group directly made Trichocompost fertilizer. After that, Trichocompost fertilizer is applied to the land which will later be planted with chrysanthemums.

Figure 2. Counseling Activities by PKM Team

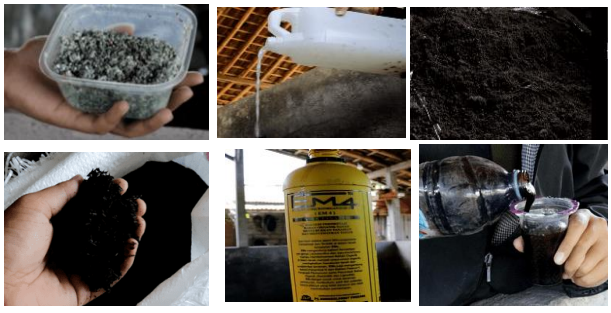

Figure 3. Ingredients for making Trichocompost fertilizer (Trichoderma sp. seeds, rice washing water, husk charcoal, EM4, Molassis and manure)

https://doi.org/10.29165/ajarcde.v7i3.341

Figure 4. Practice of Making Trichocompost Fertilizer

Figure 5. Trichocompost fertilizer application

Figure 6. Yield of Chrysanthemum Flower Plants after application of Trichocompost fertilizer

Trichocompost fertilizer is a fertilizer made from organic materials both animals and plants that have been completely decomposed by decomposer microorganisms in this case is Trichoderma sp. [5]. Broadly speaking, trichocompost contains three things that are important for plants, namely nutrients, organic matter, and Trichoderma sp. fungi. The nutrient element contained in trichocompost fertilizer is quite complete, with both macro and micronutrients, such as N, P, K, Ca, Fe, Cu Mu, Mn, and Zn. Although the macronutrient content is low, trichocompost fertilizer has advantages compared to inorganic fertilizer, which also contains micronutrients [6][7][8]. Trichocompost fertilizer contains the fungus Trichoderma sp. Trichoderma sp is one type of fungus that is beneficial to humans [9]. This fungus is antagonistic to fungi that cause plant diseases, such as Fusarium fungi, Phytoptora fungi, and Phytium fungi. Besides being antagonistic, this fungus also plays a role in the decomposition of organic matter from trichocompost fertilizer, so that the nutrients contained in organic matter are more quickly available to plants. Abilities of Trichoderma sp. That is able to parasitize plant pathogenic fungi and is antagonistic, because it has the ability to kill or inhibit the growth of other fungi. [10] found that Trichoderma sp was effective in controlling mace root disease in caisin plants. Trichoderma sp. As a biological agent, it can increase plant growth [11].

Based on the description above, the benefits of Trichocompost fertilizer are containing macro and micronutrients, improving soil structure, facilitating plant root growth, retaining water, increasing the biological activity of beneficial soil microorganisms, increasing ph in acidic soils, as control of soil infectious disease pests. Trichoderma contained in this compost functions as a decomposer of organic matter and at the same time as a controller of soil infectious disease pests [12][13][14].

This community service program provides benefits to partner groups, especially partners, who are able to make Trichocompost fertilizer and apply it to the cultivation of chrysanthemum plants. From the survey results, the results of flower damage due to rust disease reached 80%. Furthermore, after the application of Trichocompost fertilizer treatment, it suppressed rust disease by 56.4%. From this activity, it was able to reduce yield losses by 23.4% and increase farmers' income by 28.2%. Partners hope to get continuous assistance in making and applying Trichocompost fertilizer to overcome rust disease in chrysanthemum plants. The results of the activity obtained the results that rust disease in chrysanthemums can be overcome so as to improve the quality and strength of chrysanthemum flowers in the ornamental plant farmer group Agro Pudak Lestari.

4. CONCLUSION

Community service activities carried out at the Pudak Lestari Agro Ornamental Plant Farmer Group in Pancasari Village, Sukasada District, Buleleng Regency have run smoothly. From the survey results, the results of flower damage due to rust disease reached 80%. Furthermore, after the application of Trichocompost fertilizer treatment, it suppressed rust disease by 56.4%. From this activity, it was able to reduce yield losses by 23.4% and increase farmers' income by 28.2%.

ACKNOWLEDGMENT

The author would like to thank the Chairman of Korpri Welfare Foundation of Bali Province, Rector of Warmadewa University, the Head of Research at Lembang Warmadewa University, the Dean of the Faculty of Agriculture, Department of Science and Technology, Central Bicol State University of Agriculture, Philippines, and students who have helped in this research.

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