ABDIMAS
Jurnal Pengabdian kepada Masyarakat
https://journal.unnes.ac.id/nju/index.php/abdimas/

# *Trichoderma sp* . Cultivation Training as a Natural Fungicide at the *Green Lawu Forest Farmer Group* in Berjo Village, Karanganyar

Cristian Arief Jaya*, Saepul Bahri, Daniel Briliana Aprilliano, Irvan Trianto, Mohamad Imam Dimas Siswijonarko

Universitas Negeri Semarang, Indonesia
*Corresponding Author: tian@mail.unnes.ac.id

**Abstract**
Use substance chemistry in a way continously can cause accumulation residue in the soil , which is potential cause effect harm for environment . Therefore that , training intended For improve skills in groups farmer Green Lawu forest in Berjo Village , Karanganyar , in cultivation mold *Trichoderma sp*. as fungicide natural . Training done through method counseling that includes making starter media using Potato Dextrose Agar (PDA), and multiplication become product powder Ready use with flour media rice and bran . Training results show improvement understanding participant to benefit *Trichoderma sp.* , good as controller organism the bully plants (OPT) and as booster growth plants . In addition , training This succeed reduce dependence farmers on materials chemistry agriculture that is not friendly environmental and expensive. It is hoped that this program can push adoption *Trichoderma sp*. in a way sustainable For support system agriculture friendly environment in Berjo Village .

**Keywords:** Trichoderma sp., training , biofungicide , agriculture organic , OPT control

## INTRODUCTION

Berjo Village is one of village tourism in the sub- district to be honest regency Karanganyar , but with support condition topography , geography and climate make part public choose For to pursue field agriculture Good as source livelihood main and also just fulfil need kitchen everyday . The main commodities in Berjo village include vegetables, cut flowers, and moon orchids. However, farmers in Berjo village, especially the *Green Lawu forest farmer group* , still encounter obstacles in terms of land preparation and the rampant plant pests (OPT) that are difficult to control. So far, farmers have always used chemical-based materials to overcome this, which is very uneconomical and unsafe for consumption. In addition, the consistent use of chemicals can result in the accumulation of chemicals in the soil and will have negative impacts on the environment such as reduced soil microorganisms and soil vulnerability(Novianti, 2018)
Controlling OPT and soil health biologically is the best way to ensure that agricultural products in Berjo Village are safe to use at a price that remains economical. *Trichoderma sp* . is one of the antagonistic fungi that can be used to increase plant growth and suppress OPT attacks (Tehuayo, 2024).

According to Dewi et al., (2024)it is stated that trichoderma functions in breaking down organic materials contained in complex compounds so that plants will experience increased growth rates, nutrient absorption, root penetration and germination percentage. In addition, *Trichoderma sp* . is also known to have an antagonistic mechanism against phytopathogens (Hadi et al., 2023). Trichoderma can control phytopathogens because of its ability to produce several variations of enzymes such as exoglucanase, endoglucanase, cellobiase, chitinase, cellulase and protease which can damage the structure of the phytopathogen host wall and trichoderma also produces siderophores that chelate iron to stop the growth of phytopathogens (Revania et al., 2023)

This shows that the use of *Trichoderma sp* . As a biological agent for controlling plant diseases and growth stimulants has great potential. However, the use of this biological agent is considered very burdensome for farmers in Berjo village because most farmers are accustomed to using instant and practical chemicals, not easily found in local markets because they have

expensive prices and limited knowledge in the use of *Trichoderma sp* .

Therefore, the work program "Training on Cultivation *of Trichoderma sp* . *As a Natural Fungicide in the Green Lawu* Forest Farmer Group in Berjo Village, Karanganyar" was implemented with the aim of providing knowledge and skills to the Berjo village community, especially farmers who are members of the *Green Lawu forest farmer group* , regarding how to cultivate *Trichoderma sp* . *Starting from taking seeds, propagation, to obtaining the final product of Trichoderma sp* . powder . With a mixture of rice flour as the media.

## METHOD

*Trichoderma sp* . cultivation training was conducted in Selorejo Hamlet, Berjo Village, Ngargoyoso District, Karanganyar Regency in January 2025 in the form of counseling. Counseling itself is a process of providing information, education, and guidance to individuals or groups with the aim of increasing knowledge, understanding, and skills in a particular field (Sukmasari & Adi oksifa rahma harti, 2023). In its implementation, this counseling was carried out using the education and guidance method to the *Green Lawu Forest Farmer Group (KTH),* especially to Mr. Ropiq as the Head of KTH and Mr. Muwato as the Secretary of KTH *Green Lawu* . The educational and guidance materials carried out include the manufacture of *Trichoderma sp* . starter, the manufacture of *Potato Dextrose Agar* (PDA) as a starter medium, and the manufacture and propagation *of Trichoderma sp . powder* with rice flour and bran media.

The implementation stage of this cultivation was carried out for one month (during January) starting by contacting and meeting the head of KTH *Green Lawu* to discuss agricultural conditions and problems in Berjo village, especially Selorejo hamlet. The next stage is to find materials and tools that will be used to make *Trichoderma sp* . starter and breed. The tools and materials in question include a stove, pan, glass bottle, spoon, ose needle, petri dish, 1000 mL thinwall, bamboo, candles, beakers, electric scales, 1/4 kg potatoes, agar, powdered sugar, *Trichoderma sp . starter. (F1), rice, and rice flour. Next, determine the location for making Trichoderma sp.* starter and breeding which is located in the tissue culture laboratory owned by KTH *Green Lawu* in Tahura KGPAA Mangkunagoro. The next stage is making *Trichoderma sp* . starter by fishing it from the bamboo forest at the foot of Mount Lawu, making PDA, and breeding *Trichoderma sp.* with rice flour and bran media. The final stage, monitoring of Trichoderma cultures and *Trichoderma sp* . starter obtained from the bamboo forest at the foot of Mount Lawu.

## RESULTS AND DISCUSSION

The initial step in implementing this program is to conduct a location survey and obtain permits from the *Green Lawu forest farmer group* . After that, a discussion was held with representatives of the farmer group to discuss the problems often faced by farmers in Berjo village. The results of the discussion showed that currently farmers always use chemical-based materials to overcome agricultural problems. In this discussion, it was also revealed that farmers already knew about the existence of *Trichoderma sp. biological agents* which can be used as a control for plant pests as well as a growth regulator. However, the use of *Trichoderma sp* . biological agents did not continue because farmers experienced obstacles in the process of making starter cultures, propagation, and powdering trichoderma for ease of application. Therefore, a *Trichoderma sp* . cultivation training work program was implemented. To farmer groups with the hope that farmers can be independent in providing *Trichoderma sp* . And reduce use material based on chemistry .

Figure 2. *Trichoderma sp.* multiplication process series using PDA media

1. Taking *Trichoderma sp* . In Nature

At this stage of taking, simple materials and tools that need to be prepared include rice, bamboo, and raffia rope. Rice is put into bamboo that has been split into two, then closed again and tied tightly with raffia rope. After everything is ready, the bamboo that already contains rice is put into the soil in the

bamboo plantation area. After seven days, take the rice that has been buried in bamboo, the indicator of the success of taking *Trichoderma sp. mother* in nature is the presence of greenish spores on the surface of the rice and the aroma of tape. The result of this stage is *Trichoderma sp* . mother. (F0) or can be called a parent, so it still has to be multiplied again before being applied as a final product in powder form.

2. Making Potato Dextrose Agar (PDA) starter media

PDA media is one of the propagation media mold in vitro the best and most common used as multiplication mold Because its simple formulation so that mold can absorb nutrition with more easy (Irawati, 2021). The materials used are potatoes, agar powder, dextrose and distilled water. The prepared potatoes are then washed clean, peeled, cut into cubes with a side size of 1 cm and weigh all the ingredients as much as 200 g of potatoes, 20 grams of agar and 20 grams of dextrose. Then the potatoes are boiled until soft using 500 ml of distilled water, the boiled potato water is then filtered and diluted until the mixture volume is 1000 ml in a beaker. Next, pour the 1000 ml potato solution into a pan and add agar and dextrose, then boil until boiling while stirring periodically. Then the media is transferred to a petri dish or glass bottle that has been sterilized as needed and cooled until solidified.

3. Making *Trichoderma sp* . starter .

New *Trichoderma sp* . obtained from natural generally amount to little and depends on the amount of starter media (rice) used . Making this starter intended as material initial used For multiplication biofungicide experience *Trichoderma sp* . which was previously obtained from natural become form powder . This starter can made with solid media in the form of a PDA. This media used Because its simple formulation so that mold can grow and absorb nutrition with more good ( Irawati, 2021)

Next, the stage carried out in making this starter begins with sterilizing the tools to be used such as petri dishes by pouring hot water. Heat the ose needle using a bunsen flame then wait until it is cool enough. Next, apply a little trichoderma starter using an ose needle into the PDA medium by doing it near the bunsen flame to prevent contamination of other microbes or spores from sticking to the PDA medium. The PDA medium is then tightly closed and incubated for approximately seven days at room temperature, avoiding exposure to sunlight to prevent contamination and damage to *Trichoderma sp* . After three days, white spots or *Trichoderma sp* . mycelium will begin to appear, indicating that *Trichoderma sp* . is growing well. On the seventh day, the media has begun to be filled with *Trichoderma sp* . fungi, which is indicated by the green color on the surface of the PDA.

4. Propagation of *Trichoderma sp* . With Rice Flour Media

Rice is a good natural medium for the growth of *Trichoderma sp fungi* . However, the texture and shape of rice sometimes complicate the process of sowing and processing trichoderma fertilizer. On the other hand, one of the good materials used as a propagation medium is rice flour. As research Prasetyo et al., (2024)states that trichoderma with rice flour media is effective in increasing the growth of leaves and stems of plants.

The stages in this propagation process begin with sterilizing a 1000 mL thinwall vessel and a spoon that will be used as a propagation medium. Next, rice flour is put into a 1000 mL thinwall as much as 200g. The rice flour in the thinwall is then sprayed using a sprayer with distilled water until the conditions in the vessel become moist. Put a few pieces of starter into the rice flour media. Then spray again until the edge of the vessel looks wet. *Trichoderma sp* . can grow well in humid environmental conditions and acidic pH (Wahidah et al., 2022). Therefore, it is best to spray the media every day to maintain environmental humidity. After three days, the aroma of the media will change to be more sour and white mycelium threads will appear indicating the growth and development of Trichodrma sp. The presence of this sour aroma is produced from the metabolic process *of Trichoderma sp* . Which produces organic acids (Revania et al., 2023).

## CONCLUSION

*Trichoderma sp* . cultivation training carried out by the GIAT 10 Berjo KKN Team, Semarang State University, has a positive impact on increasing the knowledge and skills of farmers in Berjo Village, especially the *Green Lawu Forest Farmer Group* . This training helps farmers understand how to utilize *Trichoderma sp* . as a natural fungicide that is economical, environmentally friendly, and can reduce dependence on chemicals. Through this training, farmers not only gain technical skills, such as making *Trichoderma sp . starter* , starter media, and ready-to-use powder products, but also gain insight into the benefits of *Trichoderma sp* . in improving plant health and soil fertility. With this program, it is hoped that farmers can independently produce biological agents and increase agricultural yields sustainably.

To ensure sustainability, it is recommended that farmer groups in Berjo Village improve *Trichoderma sp . propagation facilities* , and receive ongoing assistance from the implementation team. Collaboration with research institutions or the government is also important for technical support and distribution. Socialization of the benefits of *Trichoderma sp* . to farmers can expand adoption, while

product diversification such as ready-to-spray liquids can facilitate application and increase competitiveness in the local market.

**REFERENCES**

Dewi, SM, Ningtyas , DNY, Amalia, IS, & Ramadhan, RAM (2024). Response Growth Plant Corn ( Zea Mays L.) Against Giving A number of Dose TRICHODERMA SP. Biofertilizer. Biogeneration *, 9 ,* 670–675.

Hadi, P., Rachmawatie , SJ, & Masnur , Moh. (2023). Comparison of Chemical and Biological Control Techniques to Stem Rot Fusarium Spp. On Fig Seedlings (Ficus Carica L.) as an Effort to Substitute Agrochemical Inputs in Environmentally Friendly Control. *Journal Science Education Research* , *9* (3), 1209–1216. https://doi.org/10.29303/jppipa.v9i3.3034

Irawati, W. (2021). VIRTUAL PRACTICE ON SIMPLE MAKING OF POTATOES DEXTROXE AGAR MEDIUM AND ISOLATION OF FUNGUS ON SEEDS. *BIO-EDU: Journal of Biology Education* , *6* (3), 289–299. https://doi.org/10.32938/jbe.v6i3.1341

Novianti , D. (2018). Propagation of Trichoderma sp. Fungi on Several Media. *Sainmatika : Journal Scientific Mathematics and Science Natural Science* , *15* (1), 35. https://doi.org/10.31851/sainmatika.v15i1.1763

Prasetyo , J., Efri , E., & Pratama , VTA (2024). THE EFFECT OF CARRIER MEDIA TYPES AND Trichoderma sp. ON DOWNSHOW DISEASE AND CORN PLANT GROWTH. *Journal Agrotech Tropics* , *9* (1), 206. https://doi.org/10.23960/jat.v12i1.8555

Revania , S., Doo, P., Meitiniarti , V.I., Kasmiyati , S., Betty, E., & Kristiani, E. (2023). *Trichoderma spp., The Multi-Functional Fungus Trichoderma spp., The Multi-Functional Fungus* (Vol. 1, Issue 1). https://ejournal.uksw.edu/jtm

Sukmasari , MD, & Adi Oxyfa grace harti . (2023). Training Propagation of Local Trichoderma Sp. as a Biological Agent in Palabuan Village Subdistrict Sukahaji Regency Majalengka . *BERNAS: Journal Devotion To Society* , *4* (2), 1022–1027. https://doi.org/10.31949/jb.v4i2.4650

Tehuayo , JH (2024). SOCIALIZATION AND PRODUCTION OF ORGANIC FERTILIZER FROM TRICHODERMA MUSHROOM TO FARMERS IN RUMAH TIGA VILLAGE. *Pattimura Serving : Journal Devotion To Society* , *1* (4), 338–341. https://doi.org/10.30598/pattimura-mengabdi.1.4.338-341

Wahidah, TH, Mustikaningtyas , D., Widiatningrum , T., & Dewi, P. (2022). The Influence of Environmental Factors to Trichoderma spp. Growth and Activity Enzyme Amylase and Xylanase . *Life Science* , *11* , 108–119.