Analysis Of Macro Nutrients Of Chicken Manure Decomposed By*trichoderma Viride*mushrooms With Different Storage Lengths

Darmadi Erwin Harahap[1*], Siti Hardianti Wahyuni[2], Muhammad Darwis[3], Muharram Fajrin Harahap[4] ,Mizan Maulana[5]

[1]Lecturer of Agrotechnology Study Program, Faculty of Science and Technology, University of Muhammadiyah South Tapanuli, Indonesia
[2]Lecturer of Agrotechnology Study Program, Faculty of Agriculture, University of Graha Nusantara Padangsdimpuan, Indonesia
[3]Lecturer in the Biology Education Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah South Tapanuli, Indonesia
[4]Lecturer in Animal Husbandry Study Program, Faculty of Science and Technology, University of Muhammadiyah South Tapanuli, Indonesia
[5]Lecturer agricultural science Study Program, Faculty of Agricultural and Animal Husbandry Sciences, Muslim Indonesian National University, Bireuen, Aceh, Indonesia
*Coresponding Author:
Email: darmadierwin@gmail.com

Abstract.
Trichoderma spp. It is an antagonistic fungus that is very important for biodiversity control. This research was conducted at the Laboratory of the Faculty of Agriculture, Universitas Graha Nusantara Padangsidimpuan, with a height of + 480 m above sea level, in August to September 2018. This study only analyzed the nutrient content contained in the finished compost consisting of five compost treatments, namely: A0 = Chicken manure decomposed by T.viride for 0 weeks, A1 = chicken manure decomposed by T. viride for 1 week, A2 = chicken manure decomposed by T. viride for 2 weeks, A3 = chicken manure decomposed by T. viride for 3 weeks, A4 = chicken manure decomposed by T. viride for 4 weeks. Of the five compost treatments then analyzed the nutrient content which includes N, P, K Total in the Laboratory of Soil Science ANDALAS Padang West Sumatra. The results showed that based on the results of laboratory analysis it can be known that compost with the addition of good trichodermaviride decomposer is good by 4 weeks of storage (A4) i.e. organic B = 45.70 %, organic C = 91.03 , Ratio C / N = 11. 13 %, N Total = 3.51 %, P Total = 3.41 % , K Total = 1.58 %.

Keywords: *Compost, Chicken manure and macros and Nutrients.*

I. INTRODUCTION

Trichoderma spp. It is an antagonistic fungus that is very important for biodiversity control. Mechanism of fungal antagonist Trichoderma spp. Against the host is in the form of competition for places of life, parasitism, antibiosis, and lysis (Elfina, et. al, 2001). Trichoderma is also able to accelerate plant growth and increase crop production (Suwahyono, 2003). Another advantage of Trichoderma is that it can be used as an environmentally friendly biofungicide and can act as a decomposer (Soesanto, 2004).Trichoderma spp. It is an antagonistic fungus that is very important for biodiversity control. Mechanism of fungal antagonist Trichoderma spp. Against the host is in the form of competition for places of life, parasitism, antibiosis, and lysis (Elfina, et. al, 2001). Trichoderma is also able to accelerate plant growth and increase crop production (Suwahyono, 2003). Another advantage of Trichoderma is that it can be used as an environmentally friendly biofungicide and can act as a decomposer (Soesanto, 2004).Soil organic matter is in a dynamic condition as a result of soil microorganisms that use it as a source of energy and carbon (Agus, 2012). Organic fertilizers are able to help soften soil structures, nutrients are available to plants, and are environmentally friendly.

The provision of a number of fertilizers to achieve a balanced and optimal level of availability of essential nutrients in the soil aims to increase the productivity and quality of crop yields. Organic fertilizers need to be decomposed by microbes and require a suitable environment in order to mature perfectly quickly and not have a negative impact on social, aesthetic or health aspects in the environment (Agus and Wulandari 2012).The use of manure is one alternative to maintain and increase soil fertility. The benefits of

manure are not only determined by the content of nitrogen, phosphoric acid, and potassium alone, but also contain almost all the nutrients that plants need. Chicken coop fertilizer also contains cosidiostat substances that serve as herbicides. If used in high doses continuously it can be an alleleopathy substance that can inhibit the growth of seeds and seeds (Sutanto, 2002). Application of Trichoderma spp mushrooms. On a broader scale, mass propagation is required using organic materials, such as manure and agricultural waste. Organic matter in the form of plant litter, compost and animal waste is essential for microbial life (Moraj et al., 2009).The process of maturation of organic fertilizer takes a long time, while the use of organic fertilizers that are not yet perfectly mature will have a negative impact on social, aesthetic and health aspects in humans, animals and even plants so it is necessary to decomposition to speed up the process of maturation of organic fertilizers.

II. METHODS

Place and Time. This research will be conducted at the Laboratory of the Faculty of Agriculture, Graha Nusantara Padang Sidimpuan University. From August to September 2020.Materials and Tools. The materials used in the study were chicken manure, T. viride mushrooms, PDA, bran, black soil, heat-resistant plastic, aades, 70% alcohol, spritus, tissu, aluminum foil, aquades, dextrosa, agar and rice. The tools used in the study were erlenmeyer, measuring cups, analytical scales, hotplates, petri dishes, spatulas, bunsen, cock borer, cameras, trays, scales, transparent plastic, rubber bands, spoons, tarps and buckets.

Research Methods. This study only analyzed the content of nutrients contained in finished compost consisting of five compost treatments, namely:

A0 = Chicken manure decomposed by T.viride for 0 weeks.
A1 = chicken manure is decomposed by T. viride for 1 week.
A2 = chicken manure is decomposed by T. viride for 2 weeks.
A3 = chicken manure decomposed by T. viride for 3 weeks.
A4 = chicken manure decomposed by T. viride for 4 weeks

Preparation of Trichoderma viride mushrooms

*T. viride*is a superior isolate and has been tested effective in suppressing the growth of Fusarium oxysforum f. spCubense in vitro and in planta in banana plants. The isolate is an isolate that is stored in sterile soil as a stock culture in the laboratory. For the rejuvenation of T. soil viride is taken using a spatula, then placed on a petri dish that has contained a PDA medium and incubated for 3 days. The growing mushrooms are cut using a cock borer and transferred on a Petri dish that has contained a PDA medium and incantated for 6 days. T. viride

Multiplication of Trichoderma viride Mushrooms

Preparation of rice and mass propagation of Trichoderma viride. Rice is soaked for about 3 minutes with hot water then lined and hardened. The rice is put in a heat-resistant plastic of 100 g, and sterilized using an autoclave for 15 minutes until the temperature reaches 12º¬¬C then cooled. Sterilized rice media is inoculated with a 3-day-old T. viride breed using a cock borer diameter of 0.7 cm and incimated for 15 days (Nurbailis and Martinius, 2011).

Preparation of Organic Materials

The organic material used is manure (chicken). The criteria for chicken manure used is chicken manure that is still wet as much as 2 kg and placed in a room that is protected from rain and direct sunlight.

Composting (decomposition of chicken manure with T.viride)

The organic material used is chicken manure. Chicken manure is weighed as much as 2 kg then mixed with starter T. viride, bran and black soil which is each as much as 10% of the weight of chicken manure, put in the tray and then closed and incusted during treatment and compost behind and lid again.

Macro Nutrient Testing

Testing is done after compost storage in accordance with the treatment, namely with a storage length of 1 week, 2 weeks, 3 weeks and 4 weeks and 0 weeks (control).

III. RESULTS AND DISCUSSIONS

The nutrient content in compost determines the quality of compost. The results of the analysis of the nutrient content of compost analyzed in the laboratory include N-total, P total, K total, C /N ratio, and moisture content (Table 1).

Table 1. The results of compost analysis, chicken manure decomposed with Trichodermaviride with different storage lengths.

Parameters	Unit	SNI	Control	A1	A2	A3	A4
C-Organic	%	9,80-32	26.82	32,18	45,12	45,57	45,70
B-Organic	%	27-58	93,63	79,36	90,14	90,90	91,03
Racio C/N	%	10-20	26,77	15,32	12,36	15,54	11,13
N-Total	%	0,40	2,50	2,47	2,60	3,46	3,51
P-Total	%	0,10	2,60	2,47	3,20	3,38	3,41
K-Total	%	0,20	1,16	1,15	1,29	1,53	1,58

From the results of laboratory tests obtained results that the treatment of A1, A2, A3 and A4 has a fairly good nutrient content. When compared to SNI compost standards, the A1, A2, A3 and A4 compost treatment meets the SNI compost standard for all parameters for all N, P,K Total, B Organic, C-Organic and C/N ratios.Treatment A1, A2, A3, A4 with T.viride decomposer has the largest N content, namely in the treatment of A4 (with a storage length of 4 weeks) which is 3.51%, while A1 has an N content of 2.47%. Based on this value, the compost produced has met the content of N according to SNI compost fertilizer which is > 0.40%. A4 treatment has a higher P content, which is 3.41% while A1 has a content of 2.47%. Based on this value, the compost fertilizer produced has met the content of P according to SNI compost fertilizer which is > 0.10%. This is thought to be because chicken manure has been decomposed first with different storage periods so that microorganisms in the compost work optimally compared to control.Some research results of chicken manure applications always provide the best crop response in the first season. This happens because chicken manure is relatively faster decomposed and has sufficient nutrient levels when compared to the same number of units as other manure (Hartatik and Widowati, 2006). According to Salma and Gunarto (2006) that one of the functional microorganisms used as bioactivators is the fungus Trichoderma sp.

Giving of trichodermasp mushrooms. At the time of composting can speed up the composting process and improve the quality of compost produced because this fungus produces the enzymes celobiohydrolase, endogliconase and glokosidase that work synergistically so that the decomposition process can take place more quickly and intensively.The results of the study (EPA. 2000) also stated that the use of Trichoderma sp as a biological agent that helps degrade organic matter so that more nutrients are available for plant growth. The potential of Trichoderma sp with chicken manure has the highest value in producing high plants. Selanjuntnya, Suryanti et al., (2003) states that the biological agent *Trichoderma*sp is able to decompose lignin, cellulose, and kithin from organic matter into nutrients that are ready to be absorbed by plants.A4 treatment with a higher K content as 1,58 ppm, while A1 has a K content of 0.15 ppm. Based on this value, the compost produced does not meet the K content according to SNI compost fertilizer, which is > 0.20%.It is suspected that the application of Trichoderma sp. has not been able to increase the nutrients contained in the compost.. The increasing length of compost storage will lead to higher nutrient content in compost. These nutrients will be used by plants to carry out their lives including the processes of photosynthesis and respiration (Amin, e*t. al*, 2015).

IV. CONCLUSION

The results showed that based on the results of laboratory analysis it can be known that compost with the addition of good Trichoderma viride decomposer is by 4 weeks of storage (A4) i.e. organic B = 45.70 %, organic C = 91.03 , Ratio of C / N = 11, 13 %, N Total = 3.51 %, P Total = 3.41 % , K Total = 1.58 %.

V. SUGGESTION

1. This research is applied on the ground to get maximum results.
2. It is recommended for future research to look for other types of organic matter that are more suitable and can be more quickly decomposed by T. viride.

REFERENCES

[1] Agus, C. 2012. Management of Organic Matter: Role in Life and environment. KP4 and BPFE Press. Yogyakarta. 230 things.

[2] Agus, C., and Wulandari, D. 2012. The Abundance of Pioneer Vegetation and Their Interaction with Endomycorrhizae at Different Land Qualities after Merapi Eruption. ***JMHT*** 18(3):145-154.

[3] Amin, F., Adiwirman and Sri Yosefa. 2015. Study Of Leguminosa Compost Fertilizer Application Time With Bioactivator Trichoderma sp. Against the Growth and Production of Red Chili Plants (Capsicum annum L.) ***Jorn Faperta*** Vol 2. Riau University.

[4] Elfina, Y., A Arsyad, Agus Salim, Jefri Efendi and EfitaRahmi. 2001. Use of Trichoderma Local Riau Biological Agent as Biofertilizer and Biopesticide in PHT to Control Disease and Increase Rice Production. Research Report. Riau University and Agricultural R&D.

[5] EPA. 2000. Trichoderma hazianum Rifai Strain T–39 (119200) Technical Dokument.http://www.epa.gov/pesticides/search.htm.

[6] Hartatik dan Widowati, 2006. Pupuk Kandang, hal 59-82. Dalam R. D. M. Simanungkalit, D. A. Suriadikarta, R. Saraswati, D. Setyorini, dan W. Hartatik (Eds). Pupuk Kandang. Pupuk Organik dan Pupuk Hayati (Organic Fertilizer and Biofertilizer). ***Balai Besar Litbang Sumberdaya Lahan Pertanian Badan Penelitian dan pengembangan pertanian, Bogor***.

[7] Moraj, R., Paredes C., Bustamantea M.A., Marhuenda-Egea F., M.P. Bernal. 2009. Utilisation of manure composts by high-value crops: Safety and environmental challenges. ***Bioresource Technology***, Volume 100, Issue 22, November 2009.

[8] Salma, S. and L. Gunarto. 2006. Trichoderma Activity in Cellulose Overhaul. Agricultural Research on Food Crops.

[9] Soesanto, L. 2004. Post-harvest disease science: An Introduction. General Soedirman University, Purwokerto.

[10] Soesanto, L., Mugiastuti1, E., Ahmad F., Witjaksono. 2012. Diagnosis of five major diseases due to fungus in 100 cultivars of banana seedlings. Faculty of Agriculture, General Soedirman.***J. University***. Tropical HPT. 12 (1) : 36–45.

[11] Suryanti, T. Martoedjo, A-H. Tjokrosoedarmono, and E. Sulistyaningsih. 2003. Control of Grape Red Root Disease in The with Trichoderma spp. Hlm. 143-146. Pros. XVII National Congress and FPI National Seminar, Bandung, August 6-8, 2003.

[12] Sutanto, R. 2002. *Pertanian Organik: Menuju Pertanian Alternatif dan Berkelanjutan.* Yogyakarta: Kanisius.

[13] Suwahyono. 2003. *Trichoderma harzianum, indigenesius untuk Pengendalian Hayati.* Studi Dasar Menuju Komersialisai. Makalah. Disampaikan pada Seminar Biologi.