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THE STUDY OF VARIOUS COMPOSITIONS OF BIOLOGICAL FERTILIZER INLIQUID ORGANIC FERTILIZER ON BIOLOGICAL LIQUID ORGANIK FERTILIZER QUALITY

Misfit Putrina 1), Yulensri 2), Kresna Murti 3) . 1.3) Department of Estate Crops, Agricultural State Polytechnic of Payakumbuh West Sumatera 2) Department of Food Crops , Agricultural State Polytechnic of Payakumbuh West Sumatera Jl. Raya Negara KM 7 Tanjung Pati, Telp. (0742) 7754192- (0752) 7750220 misfitputrina@yahoo.co.id

Abstract Liquid fertilizer is a fertilizer made from animal waste which is still fresh from cows, goats, chickens and leaves that are composted in the water.The benefit of liquid fertilizer is that the elements in it have been described so that the plants can directly use these elements. Liquid organic fertilizer can be applied to plants through leaves. Application of organic fertilizer on leaves has three benefits, namely, fertilizing, sowing and treating plants. Nutrient content of liquid organic fertilizer is usually lower than compost therefore technology is needed to increase the efficiency of this liquid organic fertilizer by adding biofertilizers to it.The purpose of the study to determine the composition of bio-fertilizers that can improve the quality of biological liquid organic fertilizers. Factorial Randomized Complete Design was use in this experiment. First factor applied was biological Fertilizer levels (10, 20, 30 %). While the second factor applied was liquid organic fertilizer type namely1) cow urine added organic matter, 2) water added in-organic matter, 3) water added molas. The results showed thatthe addition of biological fertilizers in liquid organic fertilizer can Increase total N content from 0.013% to 0.196%, P2O5 decreases from 0.036 to 0.026%, increases K2O content from 0.086% to 0.394% with pH 8.36 (alkaline atmosphere is very good for the development of biological fertilizer bacteria). Eh the solution increases with the thickening of the solution. Bio-fertilizers concentration did not affect the bacterial population in biological liquid organic fertilizer at the age of 14 days after inoculation. The highest bacterial population was found in the treatment of cow urine liquid organic fertilizer with the addition of 30% bio-fertilizer, namely 29,333 x 10 8 CFU / 100ml samples keywords; biological fertilizer, organic fertilizer, biological liquid organic fertilizer I. INTRODUCTION Increasing productivity of food crops by using

inorganic (chemical) fertilizers only is not a wise step considering the recent pressure in consumerincrease that requires agricultural products to be free of chemical residues so that these products are safe for consumption and the creation of a healthy environment. Therefore it is necessary to develop technologies that are safe for the environment, other useful microorganisms and especially safe for consumers. The application of organic materials is an alternative that is considered very appropriate to answer all these challenges

The use of excessive synthetic chemicals in agricultural production can reduce the quality of agricultural food products so it is not safe to consume. . In addition, the use of excessive synthetic chemicals in agricultural cultivation can result in environmental damage and decrease in land productivity. On the other hand, production costs for conventional farming practices are more expensive. To overcome this need to be done so that Indonesian agricultural production can be consumed safely and can be exported (Ministry of Agriculture, 2007). Liquid fertilizers are fertilizers made from fresh animal waste from cow feces, goats, chickens and leaves composted in water. One of the livestock wastes is liquid waste (urine). Urine can cause environmental pollution, its nutritional content 3 has the potential to encourage the life of microorganisms, so that if the urine is stagnant it can cause a pungent odor, it can stimulate flies and mosquitoes to multiply, resulting in various diseases such as dysentery and diarrhea in livestock or stock breeders (farmer).Generally male cattle weighing ± 300 kg produce urine as much as 8-12 liters per day, while female cattle weighing ± 250 kg produce urine as much as 7.5-9 liters per day (Adijaya, 2008). Whereas according to Undang (2002), cows are able to produce feces about 23.6 kg per day and urine around 9.1 liters per day. Waste that has a negative impact can actually be overcome and utilized, one of which uses cow urine to become biourin by doing fermentation. 1 Cow urine can be used as one of the potential organic fertilizers as a source of nutrients for plants because of the content of N, P and K. The nutrient content of cow urine is N at 0.076%; P is 0.014%; K is 0.271 and C is 0.106% with

C / N value of 1.39 (Pudjiarti et al., 2012). Nutrients found in cow's urine have a higher nutrient content compared to solid dung (Lingga, 1991). So far, cow feces and urine have not been managed properly by farmers, solid dung is given directly to the land after allowing for a long time without processing it first, whereas cow urine is often left wasted and not accommodated by farmers, even though this cow urine contains N , P, K which is higher than solid dung (feces). Until now, liquidwaste in cattle farm has not been widely used, one way to use urine is to process it into bio-urin. If the urine is stored it still has some disadvantages, namely the lack of nutrients it has and nutrients can evaporate or become unavailable, so that the longer the time it is stored it can cause the quality of urine to decrease. According to Sutedjo (1990) cow's urine stored, it's quality can decrease due to the evaporation process and besides that during storage there is an interaction that produces less soluble compounds which are

characterized by the formation of deposits or turbidity and cause nutrients to become unavailable II. METHODS The study was conducted from February to May 2018 in the Biology and Microbiology Laboratory and compost house of the Payakumbuh Agricultural Polytechnic. 5 Tanjung Pati. Lima Puluh Kota District. The study was conducted with 2 factors, factor I, consist of 3 doses of biological fertilizer were: M1) dose of 10%, M2) dose of 20% and M3: dose of 30%, factor 2 consist of 3 sources of liquid media, were: 1) liquid media PGN 1 = H1 (shrimp paste, sugar cane, bran, MSG) 2) PGN 2 = H2 liquid media (livestock urine, clotalaria leaves, 3 types of solid dung, coconut husk + molas), 3) PGN media 3 = H3 (water + molas) Experiments using Factorial Design in RAL (3x3) were repeated 3 times so that we got 27 experimental units. The factors observed were chemical properties: nutrient content of solution, pH, value of EC (Electrical Conductivity) and value of Eh (electrode potential). Observations carried out on days I, 7 and 14, nutrient content was carried out on day 14, bacterial population was observed on day 1 , 7, 14 with the Total Plate Count (TPC) method on solid media. 1 The results of the observations were compared with SNI for bioorganic fertilizers. The data obtained is processed by using

a statistical program. II. RESULTS AND DISCUSSION Observation analysis of Bio-POC nutrients (quality) Table 1. The effect of the treatment combination of doses of bio-fertilizer on the quality of bio-compost Combinations Analysis of Bio-POC nutrients (%) pH C-organic N Total P2O5 Total K2O Total M1H1 8,36 0,052 0,181 0,037 0,347 M1H2 8,45 0,043 0,180 0,019 0,380 M1H3 8,36 0,052 0,196 0,026 0,394 M2H1 8,78 0,046 0,012 0,040 0,205 M2H2 8,72 0,047 0,016 0,041 0,302 M2H3 8,84 0,049 0,029 0,045 0,407 M3H1 7,57 0,023 0,013 0,021 0,073 M3H2 8,67 0,069 0,022 0,039 0,364 M3H3 8,00 0,008 0,004 0,016 0,064 H1 8,63 0,074 0,564 0,029 0,374 H2 8,34 0,069 0,066 0,041 0,329

H3 8,08 0,008 0,013 0,026 0,086 From table 1 it can be seen that the addition of biological fertilizer in liquid organic fertilizer can increase the total of N content from 0.013% to 0.196%, P2O5 decreases from 0.036 to 0.026%, increases the K2O levels from 0.086% to 0.394% with pH 8.36 (alkaline atmosphere, very good 3 for the development of biological fertilizer bacteria). EC observation of BIOPOC solutions Table 2. Total population of bacteria aged 14 days after inoculation in BioPOC Kinds of Bio-POC Bacterial Concentration EC solutions (ppm) Statistical Results M1 H3 302003 A M1 (10%) H2 29693 A M1 H1 25837 A M2 H1 13213 B M2 H3 9422 BC M2 H2 8787 BC M3 H1 980 C M3 H2 840 C M3 H3 667 C Effect of doses of biological fertilizer

H3 13431 A H1 13343 A

H2 13107 A Effect of the kinds of Bio-POC M1 28578 A

M2 10474 B M3 829 C From table 2 it can be seen that the kinds of POC-compossitions material has no effect on EC solution where H1 (cow urine POC with various organic matter), H2 (POC with chemical fertilizer addition) and H3 (water plus Molas) have insignificantly different EC values according to the statistical tests. The concentration of biofertilizer affects EC solution, the lower the dose of biological fertilizer, the higher the EC value. 6 The EC value of the solution with a concentration of 30%, 20% and 10% biological fertilizer was significantly different according to the statistical test. Table 3.

No. Perlakuan Nilai EC (dS m-1) Nilai Eh (mV) 1. M1H1 0,0258 0,115 2. M1H2 0,0297 0,178 3. M1H3 0,0302 0,069 4. M2H1 0,0132 0,160 5. M2H2 0,0127 0,132 6. M2H3 0,0136 0,092 7. M3H1 0,0012 0,400 8. M3H2 0,0008 0,414 9. M3H3 0,0007 0,389 Table 4. Total population of bacteria aged 10 days after inoculation in Bio-POC Kindsof BioPOC BacterialConcentration Bacterial pop x 108 CFU/ml sample Statistical Results H1 (Urin) M3 (30%) 29.333 A H2 (Kimia) M1 (10%) 26.667 A H1 M1 16.000 A H3(Molas) M3 10,667 A H2 M3 10.000 A H3 M1 10.000 A H2 M2 (20%) 7.000 A H1 M2 5.000 A H3 M3 4.667 A The concentration of biological fertilizer combined with POC to form Bio-POC had no significant effect on the bacterial population in Bio-POC aged 10 days after inoculation (Table). Detail of growth in the population of biological fertilizer bacteria in BioPOC age 0 days after inoculation up to 15 days after inoculation can be seen in Figure 1.

Figure 1. Bacterial population growthin Bio-POC The growth of bacterial population with 30% concentration of biological fertilizer combined with POC which contains chemical fertilizers (urea, SP36 and KCL) decreased the bacterial population from observation 1 to 15 days after inoculation. The best combination is in M2H1, BioPOC which was made from various organic materials with a concentration of 20% biofertilizer, in this combination the bacterial population from observation 1 to observation 3 continues to increase (figure 1). DAFTAR PUSTAKA 1. Yulensri, Darnety, Sentot,W. 2016. Laporan kegiatan IbIKK produksi padi orgainik, syaur orgaik sertani pupuk bioorganik padat dan cair Politani. Payakumbuh. Tidak dipublikasi. Payakumbuh. 2. Sutari,GAK. 2006. Perlakuan 7 benih dengan agens biokontrol untuk pengendalian penyakit antraknosa pada cabai. Pascasarjana.IPB. Bogor. 3. Garcea de salomone IE, Nelson MN. 2004. Effects of cytokinin-producing Pseudomonas PGPR strains on tobacco callus growth. http://www.ag.auburn edu/argentina/pdfmanuscripts/estrada.pdf (28 Oktober 2004). 4. Faccini G, Garzon S, Martines M, Varela A. 2004. Evaluation of the affects 2 of a dual inoculum of phosphate-solubilizing bacteria and Azotobacter chroochoccum in 0 100 200

300 400 500 600 700 800 900 H1M3 H2M2 H1M1 H3M3 H2M3 H3M1 H2M1 H1M2 H3M2 Bacterial pop. x 10 8 CFU/100 ml sample Combination of bacterial doses with kinds of POC Bacterial popolation growth pn Bio-POC 1hari 5 hari 15 hari

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