Potential Microbe and Quality of Local Microorganism Solution (Mol) of Banana Hump Based on Concentration and Old Fermentation as Bioactivator of Railing

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ABSTRACT

The purpose of this research is to identify microbial potential and quality of local microorganism solution (MOL) of banana hump based on concentration and fermentation time as composting bio-activator. The research design used was experimental Random Factor Factorial Design (RAK). The results of this study indicated that banana cultivation were Bacillus 3,05 x 10^2, Azospirilum 1,3 x 10^6, Solvent P 2,3 x 10^5 Cellulolytic Microbe as much as 6,65 x 10^5, the highest total bacterial population on the treatment of banana hump 150gram fermentation of 20 days that is 41 x 10^6. The highest degree of acidity was in the treatment of banana hump 250 grams on day 0 that is 5.96.The highest temperature was found in 150 banana hump and 250 gram fermentation 10 days was 29,5 ^{0}C. Bio-activator with 150 gram banana cultivation treatment with fermentation length of 0 days produced the highest amount of C / N. Microorganisms from banana cultivators produced the type of microorganisms that varied so that in making the composting bio-activator was better to use the hump to produce levels of N, P, K, C with organic long fermentation of 10 days. To produce a high amount of bacteria is recommended to use banana hump bacillator with 20 days fermentation. For bio-activator with high C / N ratio it is recommended to make bio-activator from banana hump.

Keywords: *concentration, length of fermentation, quality of cobbler bioactivity banana hump.*

INTRODUCTION

MOL contains microorganisms that can ferment. MOL materials are all around us, easy to find and very cheap if we compare with the cost of buying MOL already in the market. One of the ingredients of MOL is banana hump.[1] The wet banana hump contains 43% of calories; 0.6% protein; 11.6% fat; 15% hydrate of charcoal; 60% Ca; 0.5% P; 0.01% Fe; 12% vitamins; and 86% water, while dried banana hump contains 245% calories; 3.4% protein; 66.2% fat; 60% hydrate of charcoal; 150% Ca; 2% P; 0.04% Fe; 4% vitamins; and 20% water.[3]

Microbones are the ones that used to decompose organic matter, or will act as decomposers of organic material to be composted.[12] bioactivator from the snail contain bacteria Pseudomonas flourescens.[9] The addition of K elements by utilizing the compost of banana hump is a more economical and environmentally friendly fertilizing technology compared to the addition of inorganic fertilizers.[17]

Banana hump contain high nutrients with a complete composition, containing carbohydrates (66%), proteins, water, and essential minerals.[11] .The banana hump contains microbial decomposers of organic material. The decomposition of the microorganism lies in the outer and inner banana hump.[16] The microbial species identified on the MOL of the banana hump include Bacillus sp., Aeromonas sp., And Aspergillus nigger. This is the usual microorganisms decompose organic materials.[13] Coconut water is a good medium for the growth of microorganisms during the fermentation process because coconut water contains 7.27% carbohydrate; 0.29% protein; some minerals include 312 mg L-1 potassium; 30 mg L-1 magnesium; 0.1 mg L-1 iron; 37 mg L-1 phosphorus; 24 mg L-1 sulfur; and 183 mg L-1 chlorine.[19]

The rapid growth and development of banana plants makes the availability of very abundant banana stalks.[18]. By using a certain process and the addition of alkaline sulfuric acid, the phosphorus contained in the banana hump can be processed into phosphoric acid.[20] The ingredients that have not been utilized as a source of carbohydrate are banana hump. Banana hump has a composition of 76% starch, 20% water, the rest are proteins and vitamins.[21] Banana hump are rarely used by humans and allowed to decompose naturally. But if used properly, it can be used as decomposer microorganisms. In 100 g of dried cassava, there are 66.2 g of carbohydrates, but it also contains important proteins and minerals.[22,23,4]

The microbes present in the bio-activator will help to elaborate complex chemical bonds simple. The difficulty of obtaining fertilizer impacts on the use of expensive chemical fertilizers, so it is necessary to find a way out of reducing dependence on chemical fertilizers.[15]

MATERIAL AND METHOD

Research design

The research design used was True Experimental. The design of this study using factorial randomized block design (RAK) Factor is first: the concentration of Banana hump, Banana hump 1 (150 gram Banana hump + 100 gr sugar + 1 liter coconut water.). Banana hump 2250 gram Banana weevil + 100 gr sugar + 1 liter coconut water) Second factor is fermentation length consisting of: a. F1 (Fermentation 10 days) b. F2 (fermentation 20 days). Parameters observed are: Biological properties of MOL solution include: total population of bacteria. The chemical properties of the MOL solution include the pH, N, P, K, C, C / Physical properties of the MOL solution including odor and MOL color. Data Analysis: the observed data were analyzed by using variance analysis using randomized block design of factorial pattern. If the treatment showed a real effect, then it was followed by BNT test of 5% level.

RESEARCH RESULTS

Isolation Bacteria from bio-activators Banana hump

Isolation of bacteria obtained from this research comes from bio-activator Banana hump and Observation Morphology Bacteria colonies obtained from this research derived Bio-activator banana cobs obtained Lactobacillus sp. as much as 3.05 x 102, Saccharomyces. as much as 3.4 x 105, photosynthetic bacteria. as much as 5.4 x 104, Aktinomisetes sp. as many as 1.46 x 105 bacterial isolates from bio-activators Banana hump capable of growing on the media.

Photosynthetic bacteria form beneficial substances that produce amino acids, nucleic acids and bioactive substances derived from harmful gases and serve to bind nitrogen from the air.

Figure 1. Bacterial Actinomycetes sp on banana hump

Banana hump contains microbial decomposers organic material. Microbial decomposers are located on the outer and inner Banana hump.[16] The microbial species identified in MOL banana hump include Bacillus sp., Aeromonas sp., And Aspergillus nigger. It is this microbial that usually describes organic matter.[16] Microbes on MOL Banana hump will act as decomposers of organic materials to be composted.

The high carbohydrate content in the banana stalk allows it to be fermented to produce vinegar.[25] In the process of fermentation, carbohydrates will be converted into sugars by S. cerevisiae, the sugar is converted to alcohol and the alcohol is converted by A. aceti to acetic acid. In addition to the potential in fermentation is also potential as a bio-activator in composting.[22]

Total Population of Bacteria

The result of research based on statistical analysis showed the interaction of Banana hump concentration, and fermentation time had no significant effect on total population parameter of bacteria, MOL solution. The single factor of concentration, the Banana hump, had no significant effect on all parameters. Single factor of fermentation, Banana hump, no significant effect on all

parameters.

Table 1. Results of sample examination Concentrations, Banana hump, and Length of Fermentation,

No	TYPES OF SAMPLES		DAYS TO					Number of Bacteria days to	
		0		10		20			
		PH	TEMPE-RATURE	PH	TEMPE-RATURE	PH	TEMPE-RATURE	10	20	
1	Banana hump 150 gram	10 days	4.22	27.5	3.52	29.5			$6X10^6$	
2		20 days	5.96	27.5			3.39	29.0		$41X10^6$
3	Banana hump 150 gram	10 days	4.23	27.5	4.28	29.5			$4X10^6$	
4		20 days	5.05	27.5			3.52	29.0		$6X10^6$

Seen in the results of research showed the highest result of total population of bacteria found in treatment Banana hump 150gram fermentation 20 days that is 41 x 10^6 Research results total population of bacteria MOL solution, humps increased in the fermentation, the longer the total population fermentation of bacteria growing. The main source in the manufacture of MOL solution is carbohydrates, glucose, and the source of the microorganism itself. Carbohydrate sources in this study are banana hump, glucose from brown sugar and the source of microorganisms derived from cow urine.[19]

Temperature

The results showed that the highest temperature was in the treatment of 150 bananas and 250 grams of fermentation of 10 days i.e. 29.5 0C. The duration of fermentation was real (P <0.05) against MOL temperature. BNT0,05 test result, the highest temperature was obtained at 10 days old fermentation stage, which in general was significantly different with other level. The heat produced by the fermentation process is related to the growth curve of microorganisms.[2]

pH of MOL solution

These results indicate that pH is elevated both in terms of values and elevated status from somewhat alkalis to alkalis. This suggests that microorganisms are very active in decomposing organic matter. Increased pH of bio-activators is due to the decomposition process of releasing carbonate ions and OH-ions, thus increasing the alkalinity of the bio=activator Ioncarbonate is able to attract the OH-ions and when reacting with H2O produces OH-ions so as to attract Al3 + ions from the smelting complex, H2CO3 is formed weak and precipitated Al (OH) 3 which resulted in pH bio-activators increased.[6,7] High carbohydrate content in Banana hump, allowing to be fermented to produce vinegar. In the process of fermentation, carbohydrates will be converted into sugars by S. cerevisiae, the sugar is converted to alcohol and the alcohol is converted by A. aceti to acetic acid. In addition to the potential in fermentation is also potential as a bioactivator in composting.

Color

The results showed that bio-activator with Banana hump treatment 150 gram with fermentation length of 10 days and 20 days and 250 gram banana ginger with fermentation length of 10 days and 20 days resulted in striking color change. The results of statistical analysis can be concluded that: there is a difference between treatments

Smell

The results showed that bio-activators from Banana hump with concentration 150 gram and 250 gram on day 0 showed bio-activator was odorless while at concentration 150 and 250 gram with fermentation time 10 and 20 day yield odor. Statistic result can be concluded: there is difference between treatment total population of bacteria found in treatment of Banana hump 150 gram fermentation 20 days that is 41 x. The highest degree of acidity found in the treatment of Banana hump 250 grams on day 0 that is 5.96.The highest temperature is in the treatment of 150 and 250 grams of bananas fermentation 10 days ie 29.5^{0}C.[5]

C organic, N, C / N.Number of Organic Ingredients P.K

TYPES OF SAMPLES	Time	
	10 days	**20 days**
CBP150gram	3,09 ± 0,001^{h}	4,15 ± 0,0008^{g}
CBP250gram	5,12 ± 0,0008^{d}	4,68 ± 0,002^{ef}
NBP150gram	0,016 ± 0,001^{l}	0,018 ± 0,001^{k}
NBP250 gram	0,015 ± 0.001^{l}	0,023 ± 0,0008^{j}
C/NBP150gram	187,25 ± 14,61^{e}	223,75 ± 16,58^{d}
C/NBP250gram	340,75 ± 35,25^{a}	205,75 ± 4,27d^{e}
The amount of organic matter BP150gram	5,34 ± 0,0008^{n}	7,17 ± 0,0008^{l}
The amount of organic matter BP250 gram	8,82 ± 0,05^{g}	8,09 ± 0,0009^{i}
P BP150 gram	0,011 ± 0,0009^{cd}	0,024 ± 0,04^{c}
P BP250 gram	0,014 ± 0,0008^{cd}	0,012 ± 0,001^{cd}
K BP150 gram	0,334 ± 0,1^{b}	0,237 ± 0,002^{cde}
K BP250 gram	0,243 ± 0,001^{cd}	0,25 ± 0,03^{c}

The fermentation process on the quality of the MOL solution did not go well The results of C-organic content on two week fermentation and four week fermentation increased, C-organic decreased at week six The correlation test showed an unstable positive effect between C-organic and N- total with r = 0.17.[19]

C / N

The high C / N ratio in the treatment of 250 grams of Banana hump with 10-day fermentation was due to the low N-total treatment, while the 250-gram banana flavor treatment with 20-day fermentation had a high N-total content. The higher the N-total there will be a decrease in Ratio.[19]

Nitrogen

However, with the activity of decomposition by microorganisms then the organic complex can be converted into a simple organic that eventually produces potassium elements that can be absorbed by plants. Basically, Potassium plays an important role in the photosynthesis of protein and cellulose formation, in addition to strengthening plant stems which also means to enhance plant resistance. Sutari et al showed the analysis of N-total content decreased at four weeks fermentation, but again increased in the fermentation of six weeks. The low N-Total in each treatment is due to the effect of the process occurring in the visible nitrogen cycle.[19]

N-level bio-activators of banana gums may increase and decrease depending on whether or not complete the reaction that occurs in cycle N in the process of decomposition.[7]

Phosphor

The results showed that P content increased in Banana hump treatment 150 gram fermentation length of 10 days compared to 20 days and there was a decrease

in the treatment of Banana hump 250 gram fermentation duration 10 days compared to 20 days. this is consistent with the research of Kesumaningwati who said that the Banana hump increase the total P2O5 content compared to the use of EM4 as decomposer TKKS.[7]

The linkage of P-content available with pH posif effect is not real seen from correlation test result which shows r value = 0.79 which means as much as 0.79% P-available content is affected by pH. The higher the pH the more available P-content will be increased.[19-22]

Potassium

The results showed that the K content decreased on the treatment of 150 gram bananas 150 days old fermentation compared to 20 days and fixed on Banana hump treatment 250 gram fermentation length 10 days compared to 20 days.

CONCLUSION

Microorganisms from Banana hump i.e. Bacillus as much as 3.05 x 102, Azospirilum 1.3 x 106, P Solvent 2,3 x 105 Cellulolytic Microbe as much as 6.65 x 105. The results showed the highest results of total population of bacteria found in the treatment of Banana hump 150 gram fermentation 20 days that is 41 x 106. The results showed that the highest temperature was in the treatment of stale rice 150 gram fermentation 10 days, 150 Banana hump and 250 gram fermentation 10 days that is 29,5^{0}C. The highest degree of occultism is found in the treatment of Banana hump 250 grams on day 0 that is 5.96. Bio-activator with 150 gram banana cocktail treatment with fermentation length of 0 days yields the highest amount of C / N. Microorganisms from Banana hump produce variant microorganisms so that in making composting bio-activator better use the cobs To produce levels of N, P, K, C organic with fermentation duration of 10 days.

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