THE DENTIFICATION OF POTENTIAL MICROBE OF LOCAL MICROORGANISM SOLUTION (MOL) STALE RICE, FERMENTED

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THE DENTIFICATION OF POTENTIAL MICROBE OF LOCAL MICROORGANISM SOLUTION (MOL) STALE RICE, FERMENTED CASSAVA, BANANA STUMPS AND ROTTEN FRUIT / RUMENS' COW AS BIO-ACTIVATOR COMPOSING

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ABSTRACT

Solutions of Local Microorganisms (MOL) are useful for accelerating the destruction of organic matter. MOL can also be referred to as a composting bio activator through a fermentation process. Local microorganisms can be sourced from a variety of local materials, including, stale rice, Fermented Cassava, banana stump, rotten fruit / rumens cow. The purpose of this study is to identify the Potential Local Microorganisms Solution (MOL stale rice, Fermented Cassava, banana stump, rotten fruit / rumens' cow as a composting bio activator.

The research design used was experimental manufacture of MOL**:** Stale rice of Fermented Cassava, banana stump, rotten fruit / rumens cow. The parameters observed in this study were the number of isolates found, the size of the bacterial colonies, the bacterial colonies form. Observing bacteria and observing bacterial cell shape. The morphological data of bacterial colonies obtained were analyzed descriptively and presented in descriptive and image form.

The results of this study indicated that the microorganisms found in stale rice are Bacillus sp. As many as 1x101, the microorganisms of fermented cassava were Saccharomyces as much as 8.7 x 103, microorganisms from banana cobs were Bacillus as much as 3.05 x 102, Azospirilum 1.3 x 106, Solvent P 2,3 x 105 Cellulolitic Microbe as many as 6.65 x 105 and microorganisms of rotted fruits / rumen cow consisted of Lactobacillus sp as many as 3.05x102, Saccharomyces as many as 3.4x105, photosynthetic bacteria 5.4x 104 and Actinomycetes sp as many as 1.46x105.

The results showed that microorganisms from banana and rotten / rumen cattle bunches produced varieties of microorganisms and their numbers more than stale rice and tape, so in making composting bio activator it is better to use banana stump or rotten fruits / rumen cow.

Keywords*: Solutions of Local Microorganisms (MOL), stale rice, Fermented Cassava, banana stump, rotten fruit / rumens cow. Bio-activator,*

INTRODUCTION.

Local microorganisms (MOLs) are microorganisms made from natural ingredients as a medium for the development of microorganisms useful to accelerate the destruction of organic matter (the process of decomposition into organic compost). In addition it can also function as an additional nutrient for plants, which is developed from microorganisms located in the place.

MOL can also be referred to as a bioactivator consisting of a collection of local microorganisms utilizing the potential of local natural resources. MOL can serve as a remodel of organic matter and as a liquid fertilizer through a fermentation process. Organic garbage can be utilized as organic fertilizer making material with economic value. The process of making organic fertilizers conservatively takes 8-12 weeks, while using a new system (mole addition) only takes 4 to 8 weeks and the results are better. This process requires bacteria in composting. Differences from both the process of making organic fertilizer it lies in its bioactivator (stale rice, tape, banana hump and rotten fruit / rumen cow). This method usually requires a relatively shorter time so it is more efficient. To speed up the composting process, it can be done by making bioactivator. The microbes present in the bioactivator will help to elaborate complex chemical bonds simple. The difficulty of obtaining fertilizer has an impact on the use of expensive chemical fertilizers, so it is necessary to find a way out of reducing dependence on chemical fertilizers (Setiawan, 2013).

Local microorganisms can be sourced from a variety of local materials, including cow urine, banana stems, gamal leaves, fruits, stale rice, household waste, bamboo shoots, and elephant grass and can play a role in the process of waste management of livestock, both waste solid to be used as compost, as well as liquid waste of livestock to be used as bio-urine Handling waste into organic fertilizer will provide various advantages, such as empowering the community economy, for alternative procurement of employment, the material is abundant and easy to obtain, and the market opportunities very well. With the new way, that is the addition of its bioactivator (stale rice, tape, banana hump and rotten fruit / cow rumen). On the manufacture of organic fertilizer can accelerate and improve the quality of organic fertilizer. Given some of these advantages it can be used as an alternative solution to environmental problems, it will produce H2O and CO2, as well as other compounds in the form of nutrients.

Making in this research, coconut water is used as growth medium of microorganism. According to Budiyannto, (2002) 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. According to (Muriani, 2011)

Characteristics of bacteria bioaktivator stale rice, tape, banana hump and rotten fruit / rumen cow can be known by observing the morphology of bacterial colonies, which by knowing the characteristics of the morphology it can simplify the identification of the type of bacteria Therefore it is necessary to do research to isolate and observed the morphology of bacterial colonies of stale rice bioactivators, tapes, banana stumps and rotten fruits / rumen cattle. This study aims to isolate and observe the morphology of bacterial colonies of stale rice bioactivators, tapes, banana stumps and rotten fruits / rumen cow.

RESEARCH METHODS

Place and time

Time and Place of Research This research was conducted in May 2017 until August 2017. Place of research at Lingkunga Health Laboratory stikes Surya Mitra Husada Kedirii, Laboratory of Mathematics and Natural Sciences Biology Universitas Brawijaya Malang

Materials and Tools manufacture, ol

Materials for the manufacture of MOL are stale rice, cassava tape, banana stalk, rumen cow, rotten fruit, rice wash water, sugar, coconut water, bran, sugarcane molasses, mole making tools such as scales, knives, plastic bottles. Materials and tools of examination of types and quantities of microbes Mol, Physiological saline solution (0.85% NaCl) or peptone buffer, Media nutrient agar (NA), Poteno Dexfrose agar Media (PDA), Ose and Needle Enten, Bunsen, Pipette and other glassware.

Research procedure

Making Mol

Preparation of stale MOL Stale Solution is to mix stale rice 100 grams and then added 100 grams of sugar

and added 1 liter of coconut water. Preparation of MOL Cassava Tape Solution is by mixing cassava tape 100 gram then added 100 grams of sugar and added 1 liter of coconut water Preparation of MOL Bonggol Banana solution that is by mixing banana bonggol 100 gram then added 100 grams of sugar and added 1 liter of coconut water Making of Solution MOL Rumen cow / rotten fruit is by mixing 150 grams of rotten fruit and 100 gr rumen cow + 50 ml molasses + 500 ml water leri + 50 grams bekatul.Larutan MOL that has been mixed fermented according to treatment that is 10 days.

Dilution Technique (dilution) / method of calculating the number of microbial cells

Taken 1 ml of sample and put into 9 ml physiological saline or peptone buffer solution to obtain dilution of 1/10 part. 5 ml of sample was put into 45 ml dilution solution. From the dilution solution 1/10 is taken 1 ml and included in 9 ml graphics or peptone buffer solution to obtain the diffusion of 1/100 parts. From solution 1/100 taken 1 ml and we put into 9 ml garfish or peptone buffer solution to get diffusion 1/1000 part. Determination 1/10, 1/100, 1/1000 shows the ratio. This ratio is required for the conversion of cell count calculations in the sample. The number of cells in each dilution dilution is represented by the number of colonies growing in the agar plate, the number of microbial cells can be known by the way Number of colonies x 1 / dilution Pour Plate Technique / Pour Plate Technique / Cast plate it is a technique to obtain pure colonies from a mixed population of microorganisms. This technique is done by mixing the media so that is still liquid with bacterial culture stock. Medium to be melted is by heating in water bath and cooled (50oC). Then it poured into the cup / plate. This technique is commonly used in TPC (Total Plae Count) test. The advantages of this technique are microbes that grow can be spread evenly on the agar media.

Take a sample of 0.1 ml of each dilution. Put it into a sterile petri dish. Immediately close the cup to avoid contaminants. The growth medium is heated first. After boiling evenly until the temperature is 40 oC - 50 oC. To isolate the bacteria, the cup is added with Nutrient agar medium to isolate the mushroom by adding potato medium Dextose Agar (PDA) 100 ml of medium in order to be used for 8 breeding cups .. move the petri dish slowly to form the number 8 on the horizontal table to stir mixed media agar with microbial culture dilution. After solidify place the saucer plate in reverse position. Incubation was carried out at room temperature for 24 hours for bacteria while for mushrooms incubation was done for at least 3x24 hours. Observe the characteristics of growing colonies.

Parameter of Research

The parameters observed in this study were the number of isolates found, the size of bacterial colonies, the shape of bacterial colonies, the shape of the edges of the colony, and the color of bacterial colonies.

Observing bacteria and observing bacterial cell form

Data analysis

The morphological data of bacterial colonies obtained were analyzed descriptively and presented in the form of tables and figures.

RESULTS AND DISCUSSION

Bacterial Isolation from stale rice bioactivators

Isolation of bacteria obtained from this research comes from stale rice bioaktivator and Morphological Observation Bacterial Colonies obtained from this study came Bioactivator of stale rice obtained Bacillus sp. as many as 1 x 101 bacterial isolates from stale rice bioaktivator capable of growing on the media. According to Dewi (2008), bacterial isolation is taking or removing microbes from their environment in nature and growing them as pure cultures in an artificial medium. One of the isolates can be seen in Figure 1 below

Figure 1. Bacillus on Stale rice

Purification of isolate is aimed to get a pure culture. In this study purification of isolates done twice so obtained a really pure isolates.

Bacillus sp is a rod-shaped bacterium, classified as gram-positive, motile, producing spores that are usually resistant to heat, aerobic (some facultative anaerobic species), positive catalase, and variable oxidation. Bacillus sp is a rod-shaped bacterium, classified as gram-positive, motile, producing spores that are usually resistant to heat, aerobic (some facultative anaerobic species), positive catalase, and varying oxidation. Each species is different in the use of sugar, some ferment and some do not. Bacillus has interesting physiological properties because each type has different abilities, including: (1) capable of degrading organic compounds such as proteins, starch, cellulose, hydrocarbons and agar, (2) capable of producing antibiotics; (3) plays a role in nitrification and dentrification; (4) nitrogen binders; (7) is a khemolitotroph, aerobic or anaerobic, anaerobic, acidophilic, psychoprifilic, or thermophilic.

Bacillus cereus bacteria belonging to the type of mesophilic bacteria is capable of converting the form into heat-resistant endosprora, so as to survive during the cooking process of rice. A bacillus cereus bacterium is a type of bacteria that produces toxins. This poison can cause two types of diseases that are characterized by that is characterized by diarrhea and the other is nausea and vomiting. This type of bacteria is present in the diet and can multiply rapidly at room temperature.

Bacillus cereus produces one vomiting toxin (ETE) and three different enterotoxins: HBL, NHE and EntK. The source of these bacteria is from a variety of foods, especially rice and food scraps, as well as sauce, soups and other processed foods that are stored too long at room temperature. Incubation period of bacterial diseases are: diarrhea 6-15 hours, nausea vomiting 30 minutes-6 hours. How to overcome the disease caused by bacteria is to drink lots of water and rest. If you do not eat enough fluids to prevent dehydration, then you should visit your local health service or contact your doctor. Bacillus cereus bacteria that have been colored become purple. Shows the dominant bacteria found in rice belonging to the gram-positive group, and after identification of the bacteria have characteristics: streptobacil and endospores in the middle of the body.

Isolation of Bacteria from Tape bioactivator The bacteria isolation obtained from this research comes from stale rice bioactivator and Morphological Observation of Bacteria Colony obtained from this research originated Bioactivator Tape obtained Saccharomyces sp. as many as 8.7 x 103 bacterial isolates from Tape bioactivators are able to grow on the media. According to Dewi (2008), bacterial isolation is taking or removing microbes from their environment in nature and growing them as pure cultures in an artificial medium. One of the isolates can be seen in Figure 2 below.

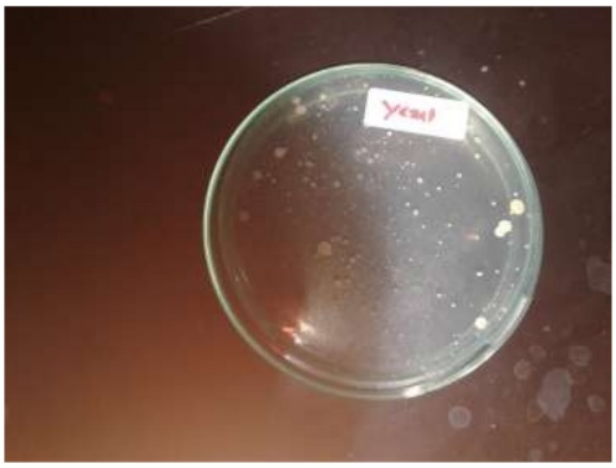

Figure 2 Saccharomyces on tape

Saccharomyces is a genus of yeast / yeast / yeast that has the ability to convert glucose into alcohol and CO2. [1] Saccharomyces is a non-chlorophyllic single-celled microorganism, including the Eumycetes group. It grows well at 30oC and pH 4.8. [1] Some of the advantages of saccharomyces in the fermentation process is that microorganisms rapidly proliferate, resistant to high alcohol content, resistant to high temperatures, have stable properties and quickly hold adaptasi.Beberapa species Saccharomyces able to produce ethanol up to 13.01%. These results are better than other genera such as Candida and Trochosporon. The growth of Saccharomyces is influenced by the addition of nutrients ie C element as carbon source, N element obtained from the addition of urea, ZA, ammonium and pepton, minerals and vitamins. The optimum temperature for fermentation is between 28 - 30 oC. Some of the species included in this genus include Saccharomyces cerevisiae, Saccharomyces boullardii, and Saccharomyces uvar

Isolation Bacteria from bioactivators Banana Stumps

Bacterial isolation obtained from this research comes from bioactivator Bonggol banana and Morphological Observation Bacterial Colonies obtained from this research originated Bactobacillus sp. Bioactivator obtained bactobacillus sp. as many as 3.05 x 102, Saccharomyces. as many as 3.4 x 105, photosynthetic bacteria. as many as 5.4 x 104, Aktinomisetes sp. as many as 1.46 x 105 bacterial isolates from bioactivators Bonggol banana capable of growing on the media. According to Dewi (2008), bacterial

isolation is taking or removing microbes from their environment in nature and growing them as pure cultures in an artificial medium. One of the isolates can be seen in Figure 3 below.

Figure 3 Lactobacilus on banana stumps

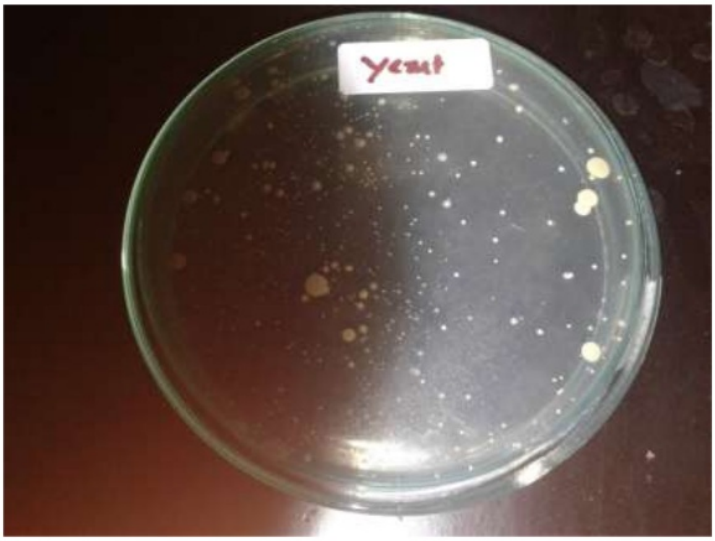

Figure 4 Saccharomyces on banana stumps

Figure 5 Photosynthetic bacteria in banana stumps

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.

Actinomycetes produce antimicrobial substances from amino acids produced by photosynthetic bacteria. Yeast produces antibiotic substances, producing enzymes and hormones, yeast secretion into substrates for effective microorganisms of actinomycetes lactic acid bacteria. The fermented fungus is able to decompose the organic material quickly resulting in an anti-microbial ester alcohol, eliminating foul odor, preventing insects and worms harmfully by eliminating the feed.

Figure 6 Bacterial Actinomycetes sp on banana stumps

Banana hump contains microbial decomposers organic material. Microbial decomposers are located on the outer and inner banana bonggol (Suhastyo, 2011). The microbial species identified in MOL banana stump include Bacillus sp., Aeromonas sp., And Aspergillus nigger. It is this microbial that usually describes organic matter (Suhastyo, 2011). Mikrobia on MOL banana hump will act as a decomposer of organic material to be composted.

According to Wulandari et al. (2009) banana hump contains 66.2% carbohydrates. In 100 g of ingredients, dried banana herbs contain 66.2 g of carbohydrates and on fresh banana stalks contain 11.6 g of carbohydrates. Content 9

High carbohydrate will spur the development microorganisms. The high carbohydrate content in the banana stalk allows it to be fermented to produce vinegar (Wulandari et al., 2009). 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. acetic to acetic acid. In addition to the potential in fermentation is also potential as a bio activator in composting (Widiastuti, 2008). MOL banana stump has a role in the growth of vegetative plants and plants tolerant to disease. High levels of phenolic acids help the binding

of Al, Fe and Ca ions help the availability of useful soil P at the flowering and fruiting process (Setianingsih, 2009).

Isolation Bacteria from bio activators Fruit rotten / rumen cattle
Isolation of bacteria obtained from this research comes from bio activators Fruit rotten / rumen cattle and Morphological Observation Bacterial colonies obtained from this research originated Bio activator Fruit rotten / rumen cattle gained Bacillus sp. as many as 3.05 x 102, Azospirillum sp. as many as 1.3 x 106, P. Solvent as much as 2.3 x 105, cellulolitic microbes. as many as 6.65 x 105 bacterial isolation is taking or removing microbes from their environment in nature and growing them as pure cultures in an artificial medium. One of these isolates can be seen in Figure 7 below.

Figure 7 Bacillus on a banana tree

Figure 8 Lactobacillus on rotten fruits / rumen cattle

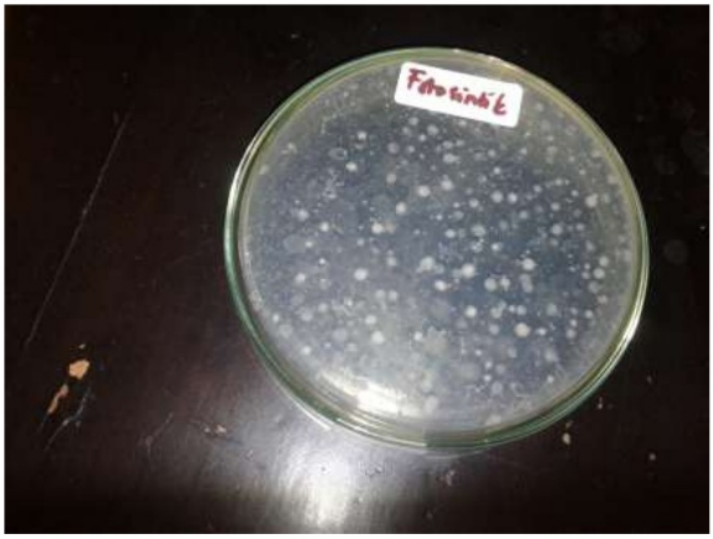

Figure 9 Photosynthetic bacteria in rotten fruits / rumen cattle

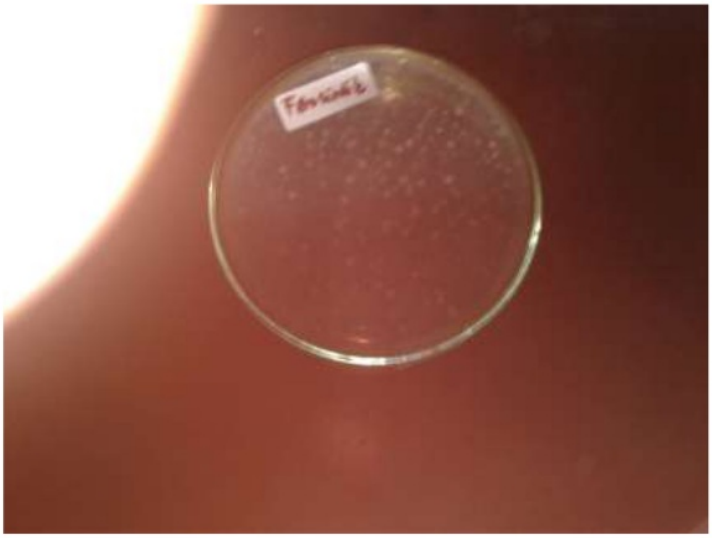

Figure 9 Photosynthetic bacteria in rotten fruits / rumen cattle

Figure 10 Cellulotic bacteria in rotten fruits / rumen cattle

MOL can be obtained from various materials around us such as rotten fruits / rumen, The bacteria content in MOL can be used as a starter for composting, bio-fertilizer, and even organic pesticides. By using the materials available in the neighborhood, cheap MOL and rotten fruits / rumen cow and rice water that do not need to be purchased, so in the manufacture only requires saving the cost of plant production. Using organic fertilizer combined with MOL can save the use of chemical fertilizers. Creation time is relatively short and the way of making is easy. In addition, MOL is also environmentally friendly

CONCLUSIONS AND RECOMMENDATIONS

The results showed that microorganisms from banana stumps and rotten / rumen cattle produced type of microorganisms that in variety and the number of more than stale rice and fermented cassava.

SUGGESTION

in making composting bio activator it is better to use banana stump or rotten fruit / rumen cow

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