# Combination Microorganism As Local Bio Activator Compost Kirinyuh

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**Abstract:** Efforts that can be made to limit nutrient losses and restore fertility of yan is by recycling organic waste such as crop residues, crop residues or residual crop residues even from weed plants.The result of recycling of organic waste is returned to the land either directly or after being processed into compost or fermented.This type of fertilizer serves as a benefactor of nutrients useful for the improvement of soil structure. Many composting processes can be accelerated by the addition of activators in the form of microorganisms that can accelerate the decomposition process of organic waste. This biotivator can be derived from local microorganisms (MOL).MOL is a fermented liquid that uses locally accessible resources. One of the natural resources that can be utilized in making MOL by mixing ingredients from the golden snail, banana hump, rumen cow and fruit waste. This MOL contains bacteria of organic matter, plant growth stimulants, pest control agents, and nutrients needed by plants. This research aims to: To make bioactivator and produce compost from kirinyuh which is rich in nutrients with the help of bio-activator of local mkroorganismeThe materials used in this research are the making of MOL is banana hump, fruit waste, golden snail, cow rumen, cow urine, coconut water, rice laundry water (leri), shrimp paste, brown sugar for MOL I. whereas For MOL II only distinguished by using white sugar .. Mol is made by fermentation. After the mole, it is continued with the maker of compost fertilizer with kirinyuh plant material, bran and fertilizer. Cage Making MOL is done in Laboratoriuam Production of State Agricultural Polytechnic of Samarinda.Based on the results of physical observations of compost kirinyuh on the 10th day (10) compost has been so with the characteristics of black, smelly soil, crumb texture while the chemical analysis of nutrients on the compost kirinyuh with bioactivator mole combination at each treatment is as followsK1M2 (N 1.37%, C organic fertilizer 29.31%, C 1M1 (N 1.45%, organic C 26.17%, C / N ratio 18.01%, P2O5 0.74%, K20 0.38%, Cao 10.47%, MgO 0.19%, pH 7.14), K1M2 (N 1.37%,, organic C 29.83% Ratio C / N 21.77%, P2O5 2.40%, K20 0.98%, Cao 10.90%, MgO 0.19%, pH 7.82), K2M1 (N 1.17%, C organic 22.90%, C / N ratio 19.57, P2O5 1.83%, K20 0.34%, Cao 10.90%, MgO 0.39%, pH 7.02), K2M2 (N 0.90%, C organic 23.17%, C / N ratio 25.74, P2O5 1.27%, K20 0.24%, Cao 10.69%, MgO 0.19%, pH 7.22), K3M1 (N 1.32%, C organic 19.72%, Ratio C / N 14.94, P2O5 3.81%, K20 0.45%, Cao 12.40%, MgO 0.39%, pH 8.04), while K3M2 (N 1.33%, C organic 21.60%, Ratio C / N 16.24, P2O5 4.07%, K20 0.98%, Cao 9.83%, MgO 0.19%, pH 8.38).

**Index Terms:** compost, bioactivator, local microorganism, nutrient

## 1. INTRODUCTION

DECOMPOSITION of organic matter is a reshuffle of organic matter by microbes in controlled conditions. Hadi (2006) states the decomposition process is known by the presence of inokulum (starter / activator) such as microbes.Microbes are an important factor in the decomposition process because the microbes will break the organic material into organic fertilizer.Microbe organisms are organic biological activators that grow naturally or deliberately given to accelerate the process of decomposition and improve the quality of organic fertilizer. The number and type of microbes determine the success of the decomposition process. Based on research result of Rusmini and Nurlaila (2012) the making of organic fertilizer in the form of cairaan less effective when fermentation time and the basic ingredients of hard cellulose fertilizer so that the basic material of the waste can not be fermented perfectly proved from the result of nutrient element analysis which is still low.The composting process can be accelerated by the addition of activators in the form of microorganisms that can accelerate the decomposition process of organic waste.

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This activator can be derived from local microorganisms (MOL).MOL is a fermented liquid that uses locally accessible resources. One of the natural resources that can be utilized in the manufacture of MOL from the golden snail.This MOL contains bacteria of organic matter, plant growth stimulants, pest control agents, and nutrients needed by plants. Plant kirinyuh (Chromolaena odorata) is a wild plant that has potential as a vegetable nematicide to control Meloidogyne spp.However, the herbs are only considered as harmful plants because of their rapid growth and can suppress the growth of cultivated plants and their toxic properties to humans and livestock so that they are viewed as a cautious plant (CRC Weed Management of Australia et al., 2003).Whereas the chemical has the potential to be utilized as a vegetable nematicide because its active compound content can be as ovisidal, larvicidal and antimicrobial (Bouda et al, 2001; Noudogbessi et al, 2008 in Felicien et al., 2012).According Adegbite and Adesiyan (2005) kirinyuh have active compound content that is as ovisidal and juvenilsidal to Meloidogyne spp. Besides as organic fertilizer, it is believed that the plant has the potential to be used as a bioherbicide with the principle of alelocheme, and also an invasive weed.The results of Susilowati (2012) study of old leaf extract and kirinyuh root significantly affect the growth and germination of spinach thorn.The results of Susilowati (2012) study of old leaf extract and kirinyuh root significantly affect the growth and germination of spinach thorn.Herbs are also potential to be used as a vegetable pesticide. The chloroquine extract was able to inhibit the hatchability of eggs and mortality of Meloidogyne spp (Huzni, et al, 2015). Kirinyuh (Crhomolaena odorata) has a high biomass production at 6 months of age producing biomass of 11.2 tons / ha while at 3 years of age produces biomass of 27.7 tons/ha.Weed biomass kirinyuh have nutrient content is quite high (2.65% N, 0.53% P and 19% K) so that the biomass of weeds kirinyuh a source of organic material that potential (Chandrashekar and Ganjanna

1996 cit Kastono 2003). These weeds are mostly in Indonesia that are annual weeds. These weeds are commonly found in uneducated or roadside farmlands in Samarinda and surrounding areas.These weeds grow fast and these weeds are always there throughout the year so that their use as compost is always available. Based on the above description then conducted a study on the Combination of Local Microorganisms as Bioaktivator Kirinyuh compost.

## 2 Procedure for Paper Submission

### 2.1 Time and Place of Study

This research was conducted from May - October 2017 in three places, namely Agricultural Laboratory of Agricultural Polytechnic of State of Samarinda (making of bioactivator),Laboratory of Agricultural State Polytechnic Production of samarinda (composting), in Physics, Chemistry and Biology Laboratory of Lambung Mangkurat University, Banjarbaru (nutrient analysis) and identification of microorganism at Control Laboratory of Lambung Mangkurat University, Banjarbaru

### 2.2 Tools and Materials

The tools used in this research are: plastic drum with capacity 200 l water, scales, grinding machine, wooden fermentation tub, mixer. Machetes, cutting pedestal and stationery. While the material used is cow rumen (2 l), banana bonggol (5), fruit waste (5 kg), golden snail (5 kg), cow urine (3 l), rice laundry water (3 l), water coconut (3 l), brown sugar (2.5 kg), white sugar (2.5 kg), teracce (125 g), kirinyuh (140 kg), bran (20 kg) and chicken manure manures (20 kg).

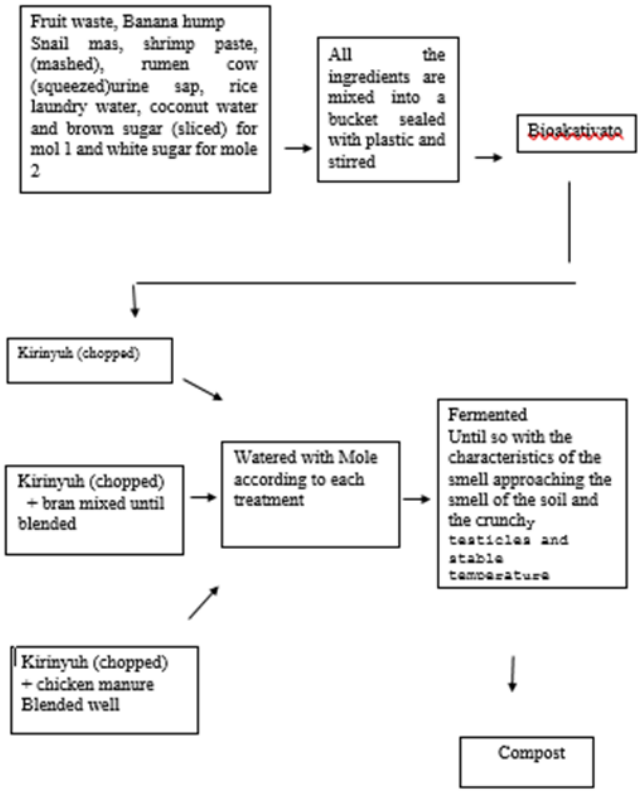
### 2.3 Research Design

This experiment is a factorial research consisting of 2 factors. The first factor consists of 3 levels: K1 = Kirinyuh, K2 = Kirinyuh + bran, K3 = Kirinyuh + manure. With combination of second factor bioactivator consisting of 2 level that is; M1 = Bioactivator I, M2 = Bioactivator II. With the combination of treatments listed in table 1 below:

***Table 1.*** *Combination treatment MOL (M) with kirinyuh (K)*

| Kirinyuh (K) | Mol (M) | |
|---|---|---|
| | M1 | M2 |
| K1 | K1M1 | K1M2 |
| K2 | K2M1 | K2M2 |
| K3 | K3M1 | K3M2 |

### 2.4 Prosedur Penelitian




### 2.5 Observations

1. Physical observation of the compost kirinyuh
2.Analysis of nutrients on compost kirinyuh

## 3 Results And Discussion

### 3.1 Making mole

Implementation of the manufacture of moles made of banana cobs, fruit waste, golden snail, cow rumen, shrimp paste, brown sugar (mol I)and white sugar (mole II) mixed with rice laundry water (leri), cow urine and coconut water. Based on the results of physical observation of the moles performed every day on the day to 10 mol is already so / ripe with the following characteristics when kissed mole already does not cause odorOn the surface of the mole there are white threads on the surface of the mole.or smell of tape, there is a change of color from brown to dark brown and and the circumstances temperatures that have stabilized for three days in a row.Result of identification on both moles there are five types of microorganisms are: Clavibacter, Agrobacterium, Clostridium, Pseudomonas berfluarescens and Erwinia. but no mushrooms / fungi were found.

1. Physical observation of the compost kirinyuh

Observation of data done is change of color, temperature, pH and odor at each treatment on compost can be seen in Table 2 below.

Table 2. Observations of Temperature, Odor, Color, pH and Texture On KirinyuhCompost On the tenth day (compost so / cook) The composting process is a natural biological process in decomposing organic materials containing carbon, minerals including nitrogen and other nutrients, as well as water controlled by microorganisms with the support of oxygen

availability.From this process there is an increase in temperature to produce CO2, evaporation and heat energy.At the end of the process produces organic matter with carbon content, chemical energy, nitrogen, protesin, humus, minerals, water and microorganisms. The decomposition of a compound is determined by the arrangement of the material, in which in general the organic compound has the fast properties described, whereas the inorganic compounds have the elusive properties described.Biological process is a natural process that is dynamic and continuous as long as factors related to the life needs of mokroorganisme that play a role in it is fulfilled.The decomposers of organic matter will take place through known process lines which are called the permentation as a whole.These organic materials in the early stages will be converted into simpler compounds such as sugar, glycerol fatty acids and amino acids. It will then proceed with other processes both aerobically and anaerobically **(Suriawiria, 2003).** According to **Starbuck, 2004**, in composting consists of several phases. During the initial phase of composting, bacteria increase rapidly.Next, filamentous bacteria (actinomycetes), fungi, and protozoa begin to work. After a large amount of carbon (C) in the compost is utilized and the temperature begins to fall, centipedes, milipedes, lice, earthworms, and other organisms continue the composting process.In the next phase, the fungus (fungi) will re-digest the organic substance for earthworms and actinomycetes to start working.Earthworms will serve in mixing organic substances that have been re-digested by the fungus with a small amount of clay and calcium contained in the body of earthworms. During the process, polymerized carbon chains will be reconstituted in the formation of humus by absorbing various cations such as sodium, ammonium, calcium, and magnesium.In the last phase, the organism oxidizes the substance of nitrogen to nitrates (nitrates) that are needed plant roots and sprouting plants such as bamboo shoots and bean sprouts.The phase of maturity (ripeness), compost will turn into dark, fragrant, crumb, and easily destroyed. hence the compost can be used. In the composting process, control of humidity, aeration, temperature and acidity (pH) should be controlled.Humidity between 50-60% is a sufficient number of optimal on composting. Composting in aerobes requires air, so it needs to be turned (turning) on he compost to create air movement. Temperature will rise in the early stages of composting, but the temperature will gradually drop to room temperature in the final stage. The acidity of the compost will increase, as the overhauled material produces simple organic acids and this acidity will return to normal when the compost has matured. **Murbandono (2000**) and **(Suwahyono and 2011)** suggest factors that determine the quality of the composting results depending 1. Comparison of carbon-nitrogen (C / N) raw materials of organic fertilizer Nitrogen is a substance that is needed by destructive bacteria to grow and multiply. The pile of compost material that has too little (low) nitrogen content does not produce heat so that the decay of the ingredients becomes too late. The C / N price of the soil is <20, so the materials that have the C / N price approximate the C / N ground can be directly used.2, The size of the material, the smaller the material size, the composting process will be faster and better because the microorganisms more easily move on the soft material than the material with a larger size. 3. Humidity plays a very important role in the process of microbial metabolism and indirectly affect the supply of oxygen. 4. Temperature / heat temperature resulting from microbial activity. There is a direct relationship between the increase in temperature with oxygen. The higher the temperature will be the more oxygen consumption and the faster the decomposition process.

5. Duration of composting The length of time of composting depends on the characteristics of the composted material, the composting method used and with or without the addition of the composting activator. 6. Water content, microorganisms need water in life and growth The composting process runs well on the initial moisture content of the material around 60-65%, because of the influence of rising temperatures then the water content will increase again. This is due to the activity of microorganisms .. If the water content increases to 80% (20-25 days) 7. Types of microorganisms involved,8. Aeration, good is needed so that the process of decomposition (composting) of organic matter goes well. Good aeration to all parts of the compost pile is essential for providing oxygen to microorganisms and liberating CO2 9. Stirring (Homogenization), stirring. the compost feedstock consists of a mixture of various organic materials that have different decomposing properties (some are easy and difficult to decompose). If the mixture of this material is not stirred, then the decomposition process does not run evenly. As a result, the resulting compost is less good.10. The use of composter, accumulation of composted organic matter must consider the adequacy of air circulation to supply the oxygen demand for the work of microorganisms, the ideal stack size is 1m3 This volume effectively retains the heat produced by bacteria. Single stack volume should not exceed 2m3 in order to keep the stack air well. 11. Reversal Composting aerobically requires a large amount of oxygen, especially during the initial process. If the oxygen supply is limited, the composting process becomes anaerobic, so the process occurs more slowly and smelly.The oxygen content in the pile will change with the reversal manually. Reversal is also required when there is a temperature difference in the pile. The availability of oxygen, and microbial activity will affect the temperature of the compost pile. Throughout the process of composting oxygen depleted quickly by microbes when the process of metabolism occurs organic substances. Oxygen makes the composting process so

2. Nutrient analysis of compost fertilizer kirinyuh

After the compost / mature fertilizer is done chemical analysis of several nutrients N, P, K, Ca and Mg The result of nutrient analysis can be seen in table 3 below.

***Table 3.*** *Result of nutrient compost analysis of kirinyuh with combination bio-activator*

| No | Parameter | Treatment | | | | | |
|---|---|---|---|---|---|---|---|
| | | KIM1 | K1M2 | K2M1 | K2M2 | K3M1 | K3M2 |
| 1 | pH $H_2O$ | 7.14 | 7,82 | 7,02 | 7.22 | 8.04 | 8.38 |
| 2. | N. Total | 1.43 | 1,37 | 1,17 | 0,90 | 1,32 | 1,33 |
| 3. | C Organik | 26,17 | 29,83 | 22,90 | 23,17 | 19,72 | 21,60 |
| 4. | Ratio C/ N | 18.30 | 21,77 | 19,57 | 25.74 | 14,94 | 16,24 |
| 5. | P2O5 | 0.74 | 2,40 | 1,83 | 1,27 | 3,81 | 4,07 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6. | K2O | 0,38 | 0,98 | 0,34 | 0,24 | 0,45 | 0.98 |
| 7. | CaO | 10,47 | 10.90 | 10,90 | 10.59 | 12,40 | 9.83, |
| 8. | MgO | 0/19 | 0.19 | 0,39 | 0,19 | 0.39 | 0.19 |

Source: Laboratory of chemistry, physics and soil biology. University of LambungMangkurat

The nutrient content of organic fertilizer also reflects organic fertilizer. When the decomposition process takes place some of the nutrients will be released through the process of mineralization.The composition of organic matter, environmental conditions, microflora and fauna properties will determine the nutrient content in organic matter **(Allison, 1973).** The higher the C / N ratio of the material then the time required for composting will be longer, the C / N ratio should be lowered first **(Indriani, 2011**).A high C / N ratio resulted in a long composting process. The release of CO2 to the uadara is accompanied by loss of nitrogen in the materials used for the activity. A high C / N ratio is thought to be due to the large C / N ratio of compost in the form of stems, resulting in the growth of late microorganisms that have an impact on the slow process of decomposition of organic matter **(Mukti, 2008)**. The high C / N ratio resulted in a slow process **(Sriharti and Salim, 2008).** Because of the low nitrogen content, on the contrary if the ratio will lead to the process formed ammonia, so that nitrogen will be lost to the air. The amount of Nitrogen lost causes the compost N element low so that C / N compost becomes high **(Susanti, 2011)** Based on the results of nutrient analysis on the compost kirinyuh withbioactivator EM4 also shows the low nutrient content is: N 1.54%, K 0.22%, P 0.37% pH 7.80% and C / N Ratio 22.06 **(Alisyahbana B, 2017). Kastono (2005)**, added composition kirinyuh 2.42% N, 0.26% P, 50.40% C, and 20.82 C / N. In addition, the leaves and twigs of green can be used to make liquid fertilizer. Based on the results of research Damanik (2009), states that the green manure of kirinyuh weed showed the results that significantly affect the height of corn plant age 5 weeks after planting (MST), Added The research results Duaja, et al (2013), states that liquid fertilizer with basic tends to be highest in Leaf Length (DLD), Net Assimilation Rate (LAB), Relative Growth Rate (LTR), number of pods and bean yield per plant.The difference of pH in the compost chirinyuh on the treatment, it shows the existence of different activity of microorganism in decomposition. According to SNI (2004) pH during composting ranged from 6.8 -7.49. The degree of acidity that does not meet the criteria according to SNI is allegedly caused by the material that is still wet and microbe in which it has not worked optimally. high pH is caused by the presence of high microorganisms in decomposing organic matter. The pH value of compostable organic matter is expected to be in accordance with soil pH so easily absorbed and used by plants **(Astati, 2011 in Ole Bengogo MB, 2013)** Suthar, 2008 in Anjangsari 2010 adds the activity of microorganisms in decomposing the material in the compost When the organic matter is overhauled by microorganisms, some of the phosphorus will be converted into a soluble P form which will be released by microorganism as well as other nutrients organic material is overhauled by microorganisms that work in organic composting materials.

## 4 CONCLUSIONAND RECOMMENDATIONS

### Conclusion

1. Mixtures of banana bumps, mashing, fruit waste and cow rumen can be made of mole and can make biofilivator compressible kirinyuh.
2. Composted / cooked compost with the aid of a combination of molactic bioactivators lasted 10 days.
3. The highest Element N content of 1.43%, P2O5 4.07%, K2O 0.98%, CaO 12.40% and MgO 0.39% while for the lowest organic C 19.72%, Ratio C / N 14.94 and pH 7.02.

### Suggestion

1. Make bioactivator from other ingredients such as from bamboo shoot, rice basih, milk basih dll
2. Make compost from other materials using combination biocalcator.
3. Increase the nutrient elements with the addition of other ingredients such as soybean roots, roots peanuts etc.
4. Application to the plant so that the treatment of fertilizer can be known which one is good.

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