

MOL Making Training for Litter Composting in Youth Organization of Kertonatan Village

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ABSTRACT

The use of fertilizers in the world continues to increase along with the increase in population and consumption of agricultural production. Among the available fertilizers, compost is one environmentally friendly fertilizer type. Compost is fertilizer derived from organic materials such as leaves, straw, reeds, trash, grass and other similar materials. The advantages of compost are that it is free of wild plant seeds, free from pathogenic bacteria, easy to use, and provides a variety of nutrients plants need. In making compost, local microorganism starters are required to supply nutrients and as components responsible for maintaining optimal plant growth processes. Therefore, training is required on making local microorganism starters for composting litter waste into compost. Training will be given to youth organizations in Kertonatan Village to increase knowledge and skills in making MOL starters. The method provides technical material about making a liquid starter and direct practice with the audience. As a result, the participants received knowledge and direct practice regarding manufacturing liquid starter (MOL) and litter composting. The training for making Local Microorganism starters for composting litter for youth organizations in Kertonatan Village went smoothly.

KEYWORDS

MOL;
Litter Composting;
Youth Organization



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1. Introduction

The starter is a microbial population in quantity and physiological condition ready to be inoculated in the fermentation medium. Microbial starters can be found in various forms, including bread-making yeast [1]. Microbes in the starter grow quickly, and fermentation occurs immediately. Microorganisms used in yeast generally consist of bacteria and fungi (yeast and mold), namely: *Rhizopus*, *Aspergillus*, *Mucor*, *Amylomyces*, *Endomycopsis*, *Saccharomyces*, *Lactobacillus*, *Acetobacter*, and so on [2]. The starter is a source of microorganisms beneficial for living things (agriculture and livestock) [3]. We can make probiotic starter ourselves by mixing Lactic Acid Bacteria and Indigenous Microorganisms (IMO) and well water sources (without chlorine) with a specific dose [4]. Making this artificial starter aims to save costs in making organic compost [5]. The role of the starter itself is as a supplier of nutrients and as a component in charge of maintaining optimal plant growth processes [6].

In the composting process, the roles of cellulolytic and lignolytic microbes are crucial because these two microbes obtain energy and carbon from the decomposition process of carbon-containing materials [7]. The aerobic composting process is faster than anaerobic, and the time required depends on several factors, including the particle size of the compost material, the C/N ratio of the compost material, the presence of air (aerobic state), and humidity [8]. Mature compost is indicated by constant temperature, alkaline pH, C/N ratio <20, Cation Exchange Capacity > 60 me/100g of ash and respiration rate <10 mg/g of compost, while indicators that can be directly observed are brown. Old (dark) and does not smell bad (smelling of the earth) [9].

Making compost with the addition of microbial fertilizers has several advantages, including: being free of wild plant seeds (weeds); free from pathogenic bacteria (bacteria that can cause disease); odorless; plants do not burn; easy to use and provides a variety of nutrients needed by plants [10].

Organic fertilizers have a complete composition of nutrient content, but the amount of each type of nutrient is low, but the organic matter content in it is very high [11]. Meanwhile, inorganic fertilizers are made by factories by mixing various chemicals to have a high percentage content. Examples of inorganic fertilizers are urea, TSP and Gandasil [12].

Compost is a fertilizer that comes from natural or organic materials because it comes from organic materials [13]. Compost is environmentally friendly if used in fertilization on an ongoing basis [14]. Compost is different from chemical fertilizers [15]. Most farmers in Indonesia use more chemical fertilizers for plants; indirectly, this activity will adversely affect soil quality and the life of microorganisms in the soil [16]. Excessive use of chemical fertilizers in the soil can reduce nutrients in the soil and cause damage to soil fertility [17].

The use of fertilizers in the world continues to increase following the increasing consumption of agricultural production, population growth, increasing levels of intensification and the increasingly diverse use of fertilizers to increase agricultural yields [18]. One type of organic fertilizer is manure. Manure has natural properties and does not damage the soil, providing macro elements (nitrogen, phosphorus, potassium, calcium, and sulfur) and micro (iron, zinc, boron, cobalt, and molybdenum). In addition, manure functions to increase water holding capacity, soil microorganism activity, cation exchange capacity and improve soil structure [19]. The direct effect of manure application makes it easier for the soil to absorb water [20]. Organic fertilizers have a complete composition of nutrient content, but the amount of each type of nutrient is low, and the organic matter content is very high. Meanwhile, inorganic fertilizers are made by factories by mixing various chemicals to have a high percentage content. Examples of inorganic fertilizers are urea, TSP and Gandasil [21].

Compost results from weathering materials like leaves, straws, reeds, grass, animal manure, city waste, etc [22]. The weathering process of these materials can be accelerated through human assistance [23]–[25]. Making compost means stimulating the development of bacteria (microorganisms) to destroy or decompose composted materials until they decompose into other compounds [26]. The decomposition process changes the nutrients bound in insoluble organic compounds into soluble organic compounds beneficial for plants. Compost is the result of weathering organic materials such as leaves, straw, reeds, garbage, grass and other similar materials whose weathering process is accelerated by human assistance. Compost is used for organic fertilizers derived from leaves or other plant parts. Good compost is compost that has undergone sufficient weathering and is characterized by a color that is different from the color of its constituent materials, is odorless, has low water content and has room temperature [26]–[30].

Benefits of compost organic fertilizer:

- Increases soil absorption of water
- Improves soil structure
- Increase microbial life in the soil
- Contains plant nutrients

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In general, the nutrient content in compost consists of: 8.2% carbon, 0.09% nitrogen, 0.36% phosphorus, and 0.81% potassium. The compost component consists of 41% liquid and 59% dry

matter. The C/N content in compost is generally 23. There are various ways to make compost, but all these methods have the same basic concept. Composting is an attempt to activate microbial activity to accelerate the decomposition process of organic matter. In the composting process, it takes 4-6 weeks to achieve maximum results, and it can be composted in 3-4 months. The stages of making compost start with the preparation, both the material and the place. After that, preparing the compost pile, monitoring the temperature and humidity, turning and watering, ripening, sifting the compost, packaging and storage.

Some of the requirements that must be met in order to produce good compost, namely:

- The compost mixture must be homogeneous so that the N content and fermentation speed can be evenly distributed and constant. Therefore, the raw materials need to be cut into smaller pieces.
- The initial temperature must be high to kill the pathogens of grass seeds and flies or the eggs and larvae of other pests and diseases (fungi) carried into the pile.
- At the beginning of composting, a large amount of water is needed to offset evaporation and activate the microorganisms.

The characteristics of good compost:

- Brown
- crumb structure
- crumbly consistency
- smells of rotten leaves.

After the composting process is complete, physically visible, among others; if held, it feels cold no longer hot; if it is squeezed, it feels brittle, and the smell and color are not what they used to be

The advantages of compost compared to chemical fertilizers:

- Provide microelements for plants
- Loosening the soil
- Improve soil structure and texture
- Increase the porosity and aeration, and composition of microorganisms
- Increases the binding capacity of the soil to water
- Facilitate root growth
- Store groundwater longer
- Prevent dryness
- Reducing the use of chemical fertilizers.
- Multipurpose

2. Method

Preparation of liquid starter

- Fruit waste is finely chopped and soaked for one week; after one week, 1 liter of water is taken
- Banana weevil is finely sliced then soaked in 2 liters of water for one week; take 0.5 liters of water after one week.
- Squeeze the cow's rumen and take the water and dilute it to 5 liters

- The bran is soaked in water, and the juice is taken as much as 1 liter
- After ingredients no. 1-4 are ready, then put them together and add 3 liters of molasses and 0.5 kg of fish meal. After the ingredients are thoroughly mixed, tap water is added to a volume of 25 liters
- Place in a 25-litre volume drum/bucket, then cover tightly and ferment for four weeks, remember to open the lid once every two days and stir it thoroughly.
- The starter is ready to use After being fermented for four weeks. To use it, 1 liter of starter is for 250 kg of compost.

3. Results and Discussion

By holding training on making liquid starter (MOL) and composting litter, which was attended by the youth organization "Askhabul Khafi", Kertonatan Village was able to provide information and innovation to the youth who took part as shown in Figure 1. The picture shows that MOL manufacturing process. Figure 2 shows that the manufacture of MOL material. By acquiring knowledge and skills in this training, youth can transmit it to the community and the surrounding environment for creativity and an integrated mindset. Community service activities emphasize training through stages where teenagers receive material in technical explanations of making waste-based starters, then material on litter composting techniques shown in Figure 3. The figure shows that the second stage of this training is the practice of making starter and composting.



Fig. 1. MOL making process



Fig. 2. MOL-making materials



Fig. 3. Measurement of compost temperature and humidity

The training was preceded by giving examples from technical speakers and how to make liquid starter shown in Figure 4. The picture shows that on this occasion, several questions arose as a response from the young participants in the training. In the starter-making training, observation of the characteristics of the starter that has been made and is ready to use is also carried out is shown in Figure 5. This figure shows that the observation parameters include changes in temperature, pH, color, and odor. Meanwhile, a mixture of composting materials, including rice bran, livestock manure and litter milling process, was also invited during the composting training shown in Figure 6. The figure shows that the parameters observed in the composting process include color, odor, texture, moisture content, pH and temperature.



Fig. 4. Mixing lime into compost



Fig. 5. Composting and checking compost temperature



Fig. 6. Litter compost sifting process

In this training, the participants were directly involved in making starter and composting shown in Figures 7 and 8. The figure shows that however, the results could only be done after a period the committee had prepared ready-made samples, namely liquid starter and solid Compost produced by students who took the organic waste treatment elective course.



Fig. 7. Litter compost products



Fig. 8. MOL products

4. Conclusion

The training on making local microorganism starters (MOL) given to Karang Taruna Askhabul Khafi of Kertonatan Village ran smoothly. The participants were able to practice making MOL starter and applying composting of litter waste into compost directly. In the future, training like this can be given to other youth organizations, and there will be ongoing coaching on composting so that this activity can be further developed as a vehicle for improving the economy and community knowledge.

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Author Contribution

The activity plan in order to implement the solutions offered training about MOL Making Training for Litter Composting in Youth Organization of Kertonatan Village

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Conflict of Interest

The authors declare no conflict of interest.

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