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Empowerment of Appropriate Technology for Making Effective Compost from Biogas and MOL Waste for the Community

Riska Rahmasari[1] , Philosopher Mutaqqin[1] , Dini Mutiatul Millah[1] , Winarista Priska K[1] , Izzul Maromi[1] , Beny Suyanto[1] , Frida Hendrarinata[1]

[1] Department of Environmental Health, Poltekkes Kemenkes Surabaya

Correspondent:
Riska Rahmasari; riskarahmasari123@gmail.com

ABSTRACT

Every human activity in their daily activities always produces waste that pollutes the environment. This can be minimized by using it as compost. So it is necessary to introduce appropriate technology for the community in the manufacture of compost using effluent digester waste from biogas waste and local microorganisms. Breeders who have related materials are invited to make fertilizer. Apart from being a nutrient supplier, the local microorganism solution also acts as a bioreactor component whose job is to maintain optimal plant growth processes. The function of a bioreactor is very complex, including supplying nutrients through the exudate mechanism, controlling microbes according to plant needs, maintaining stability of soil conditions towards ideal conditions for plant growth, even controlling diseases that can attack plants. plant. It is recommended to check the levels of N, P, K and C/N in the compost produced, so that standards are maintained.
Keywords: *fertilizers; compost; appropriate technology; biogas waste*

INTRODUCTION

Appropriate technology for making biogas from cow manure easily and at a relatively low cost while producing renewable energy to replace LPG. The success of biogas technology has also resulted in *an effluent digester* in the form of viscous compost which was previously not utilized and disposed of carelessly will add to the environmental problems. Processing of *the effluent digester* used as raw material for compost shows that compost with biogas effluent ingredients: charcoal such as: organic waste Physical assessment, namely temperature, pH, humidity, color, odor and texture and measurement of chemical levels (N: P: K; C /N ratio) meets the requirements of SNI 19-7030-2004. The more use of biogas effluent to produce compost with greater N,P,K followed by a decrease in the C/N ratio. The results of this research will be applied through the Student-Society Creativity Program (PKM-M). [1]

Making compost using biogas effluent and local microorganisms (MOL) fermentation method. Research result The best of the fermentation uses gut and tomato synergists with compost maturation time of 5 weeks, EM of tomatoes and intestines takes 6 weeks. From the practical activities of the waste management course and the results of the lecturer's research [2] , the PKM-M team was formed as well as practical training for community service. [2]

PKM-M activities were carried out in Jabung Village, Panekan District, Magetan Regency . Because the village is mostly farmers and ranchers and there are 8 units of biogas available. The village is a fostered village for D.III Environmental Health Study Program, Magetan Campus, Poltekkeskemenkes Surabaya, which is also used as a student practice area. The goal of the Student-Society Creativity Program (PKM-M) is to make effective compost from biogas and MOL waste for the community using the fermentation method so that the parameter content of nitrogen, phosphorus, potassium (N,P,K,) elements in the compost increases and suitable for use for organic farming refers to the Regulation of the Minister of Agriculture of the Republic of Indonesia No. 70/permentan/SR.140/10/2011.

The PKM-M program is realized through a mentoring process through education and training as well as field practice for biogas owners in particular and farmers in general. By increasing the knowledge and skills possessed, it is hoped that they will be able to reduce chemical fertilizers and be able to independently provide organic fertilizers and also disseminate this knowledge to other communities and ultimately be able to increase organic agricultural yields.

Communities can meet the needs of compost and transfer their experience to others in making compost, Reduce the impact of environmental pollution by utilizing biogas waste as a raw material for making compost, Students can carry out PKM-M activities in the community directly so they can add to the discourse of knowledge and skills .

The benefits of this student-community service activity are that the community in Jabung Village, Panekan District, Magetan Regency can make effective organic fertilizer/compost from biogas and MOL waste for the community using the fermentation method, students can develop scientific discourse and skills (science and technology) in making effective organic fertilizer/compost From biogas and MOL waste Introducing appropriate technology for making organic fertilizer/compost for D.III Environmental Health Study Program students Magetan Campus Health Polytechnic Ministry of Health Surabaya, community, related agencies as learning media so that it can be developed even better, reduce the impact of environmental pollution by utilizing biogas digester effluent waste to become compost.

METHOD

The application of appropriate technology is carried out by providing material and assistance in the manufacture of organic fertilizer using the fermentation method. The material used is the rest of the biogas reactor and MOL . This activity is carried out by utilizing the remaining waste from biogas mixed with MOL as an ingredient for making organic fertilizer.

From the results of the study of partner problems that have been described above, the implementation of community service for students through the PKM-M Program in education and training, especially in the manufacture of organic fertilizers/compost, is carried out with the following details:

1. - III Environmental Health Study Program Students at the Surabaya Ministry of Health Health Polytechnic consists of: 4 (four) students who are concerned and creative in campus activities.
2. The PKM-M program partners are breeders, farmers and biogas owners who live in Jabung Village, Kec. Panekan Kab.Magetan based on deliberation and consensus.
3. Methods for implementing PKM-M activities.

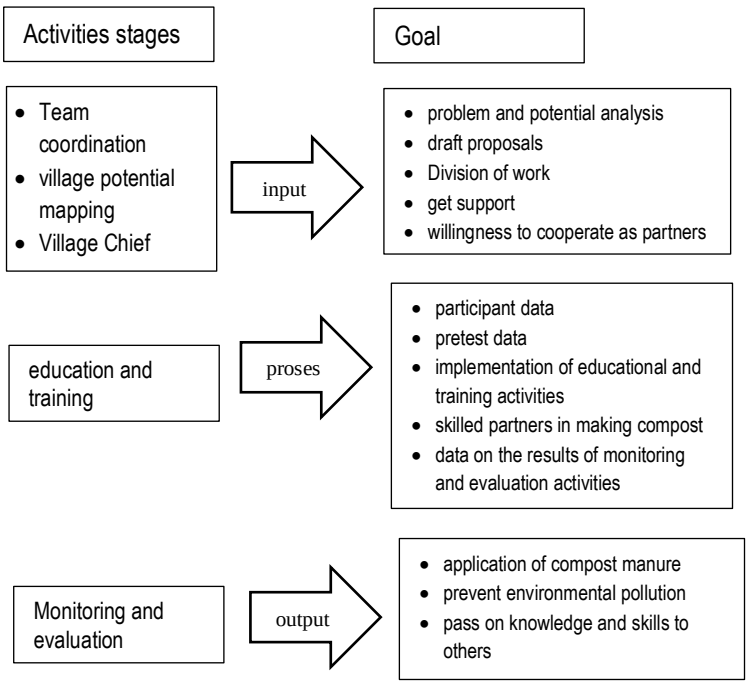

Figure 1. Block diagram of the flow of assistance in making compost in the community

To ensure the success of this activity, a PKM-M activity implementation plan was prepared by the Student Team, PKM-M Supervisors and Partners in Jabung Village, Kec. Panekan Magetan Regency by studying the factors: Input; Process activities and Output to be achieved. To overcome partner problems, namely by training and guidance (assistance). Training and guidance is carried out using lecture methods, discussions, field practice, and consulting services. Consultations can be carried out face-to-face, telephone or via electronic mail and other possible ways. For the continuity of coaching [3] . The sequence of implementing PKM-M is explained in Figure 1.

Figure 2. Preparation of compost material

Figure 3. Mixing of remaining Biogas with compost

RESULTS

Inputs

Explore data on the potential of villages that support the PKM-M Program in making organic fertilizer/compost. The efforts made were: The implementing team from Study Program D.III Environmental Health, Magetan Campus, Poltekkes Ministry of Health, Surabaya, together with partners compiled a mapping of potential livestock and agriculture areas, facilities and infrastructure, explored the potential of people who would be involved in PKM-M activities, chose the method that will be held in Jabung Village, Kec. Panekan, Magetan Regency. The implementation team from D.III Environmental Health Study Program, Magetan Campus, Poltekkeskemenkes Surabaya, carried out advocacy, namely approaching regional decision makers, in this case the head of Jabung Village, Kec. Panekan, Magetan Regency . The purpose of this activity is to get support and cooperation in the form of an agreement as a community service partner.

Process

The success of PKM-M activities is largely determined by the process of the activity itself. In order to transfer knowledge and skills in making effective organic compost fertilizer from biogas and MOL waste for the community using the fermentation method, education, training and direct practice in the field are required.

1). Education and training activities
   a) Obtain data on education and training participants.
   b) Obtain posttest result data
   c) Creating an education and training guidebook in the manufacture of compost organic fertilizer using the fermentation method which contains: tools and materials; work procedures, monitoring and evaluation of results, obstacles and constraints as well as methods of overcoming them.
   d) Carry out education and training
   e) Obtain posttest result data.
   f) Making compost at the designated training site.

2). Field practice **.**
   Practice making organic compost fertilizer using the fermentation method for 14 days and 21 days at the homes of each participant monitored by the Team. Briefly this activity can be explained as follows:

Preparation

This preparatory activity includes an explanation of site preparation, treatment preparation fermentation, preparation of digester effluent waste.

Work procedures

a) Prepare tools and materials at a predetermined location
b) Accommodate digester effluent waste and include it in the fermentation treatment
c) Add bacteria and fermenters as much as 1% , namely 1 : 10 0 (1 part bacteria compared to 10 0 parts digester effluent waste)
d) Add glucose (molasses): 1 : 100 (1 part glucose to 100 parts of digester effluent waste)
e) Add dolomite (lime): 5 to 10% : 100 (5-10% part of dolomite (lime) compared to 100 parts of digester effluent waste)
f) Make compost with biogas effluent, RT waste, ash with a ratio = 3:1:1. This means that if 3 kg of biogas effluent is used, 1 kg of organic waste and sort ash are needed each (Susinurweni, Aries P, 2017)
g) The input to the fermentation treatment is closed, but not tightly closed so that air/gas can enter
h) Every two days morning and evening stirred, so that the fermentation process goes well.
i) after 14 – 21 days Organic fertilizer/compost is ready to use
j) Note: fermenters can be made from rotten tomatoes, rotten rice, and other organic materials to make MOL.

Assessment of ripening results of compost organic fertilizer :

a) Smell: The smell of compost does not smell strong (urine). To ensure the maturity of the fertilizer is done by taking 500 ml of compost, then stored in a closed plastic for 2 x 24 hours. If the plastic swells and becomes hot or when you open the plastic it smells bad, it means that the ripening process has not been completed.
b) Texture: The texture or physical form is thick yellow, slightly brownish.
c) pH : A good pH range is 6.5-7.5 (neutral).
d) Temperature: Temperatures ranging from (30-50) ^{o}C. At the time of ripening the temperature will drop to near room temperature and will be stable at that temperature.
e) Obtaining fermented organic compost fertilizer that meets the requirements in accordance with the Regulation of the Minister of Agriculture of the Republic of Indonesia No. 70 /permentan/SR.1 4 0/ 10 /20 11
f) Creating an independent community in the effort to provide organic compost fertilizer .

output

Outputs include:

a) With the knowledge and skills possessed by residents who have participated in education, training and field practice activities, community members are expected to be able to:

b) Apply organic compost fertilizer independently, for their own needs and not depend on chemical fertilizers
c) Overcome environmental pollution and prevent disease transmission.
d) Can provide aspects of knowledge and skills to other people so they can also apply the manufacture of compost.

CONCLUSION

Communities can make and utilize the waste from biogas into organic fertilizer/compost. With the addition of Mol the decomposition time will be faster .

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