



Warta Pengabdian Andalas

Jurnal Ilmiah Pengembangan dan Penerapan Ipteks

ISSN (Print) 0854-655X | ISSN (Online) 2797-1600

Training on the Process of Making Eco Enzyme from Household Organic Waste in Tiakar Village, Payakumbuh

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Submitted: August 17, 2024

Accepted: March 8, 2025

Published: March 28, 2025

ABSTRACT

Waste is still a problem throughout Indonesia, especially in Payakumbuh, West Sumatera. Every day, humans produce a large amount of organic and inorganic waste. This illustrates the need to utilize waste in Payakumbuh City, particularly in Tikar Village. Eco enzymes are useful for processing organic waste, especially fruit waste such as fruit peels and vegetable waste. Vegetable and fruit waste can be an alternative material for eco-enzyme production, reducing alcohol from fermented kitchen waste. The community is in high demand for eco enzyme due to its effectiveness in reducing waste, particularly when produced on a large scale, and its numerous benefits. The purpose this activity to manage the people to process the organic wastes into eco enzyme to create a clean environment. The location this activity was hold in office of Tiakar Regency in east Payakumbuh, Payakumbuh City, West Sumatera. The activity results show that training on processing vegetable and fruit waste into Eco Enzyme can reduce organic waste in Tiakar Village, Payakumbuh, by making Eco Enzyme cleaning fluid or disinfectant.

Keywords: eco-enzyme, free service, organic waste

INTRODUCTION

Waste is still a problem throughout Indonesia, especially in Payakumbuh, West Sumatera. A lot of organic and inorganic waste is produced by humans every day. On 29 December 2023, the Final Disposal Site in Payakumbuh, West Sumatera collapsed because it exceeded its capacity, which only had an area of 1.5 hectares. People do not sort their waste before throwing it into a temporary disposal site. However, based on the amount of waste the community produces, this amount will increase to 80-85 tons per day from 2023.

Of the 85 tons/day of waste, only around 3% of organic waste is recycled into essential fertilizer and 1% into finished compost, as shown in Figure 2. Figure 2 shows that the amount of waste the community manages is still minimal. If waste is put into the Final Disposal Site without any intervention, it will cause health problems and environmental damage. According to Saibah et al. (2018), waste is organic and inorganic waste that is no longer useful and needs to be managed to avoid endangering the environment. Organic waste is material that is considered useless and then discarded because it cannot be decomposed again. Leftover vegetables, fruit peels, and other fruits are examples of organic waste (Rusdianasari et al., 2021).

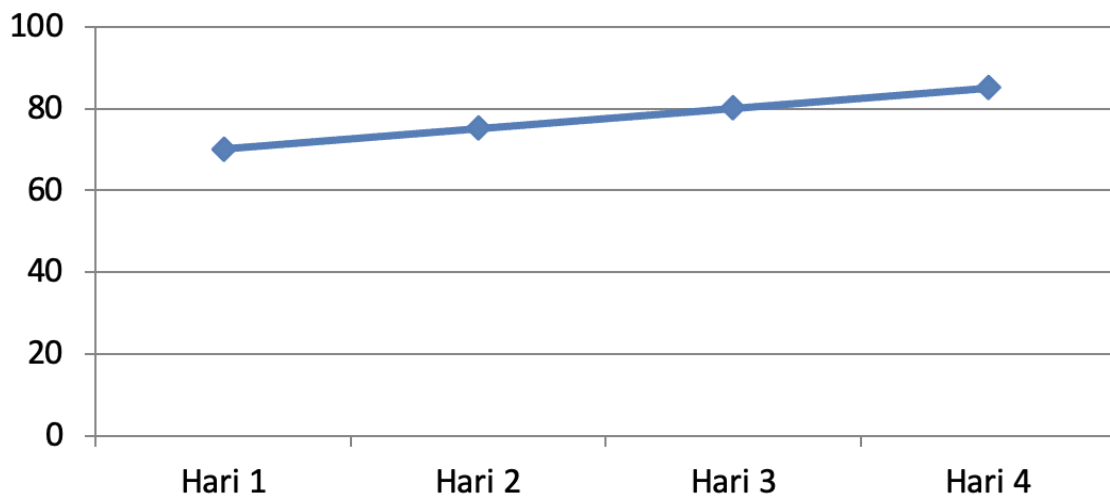


Figure 1. The amount of waste produced by the Payakumbuh community

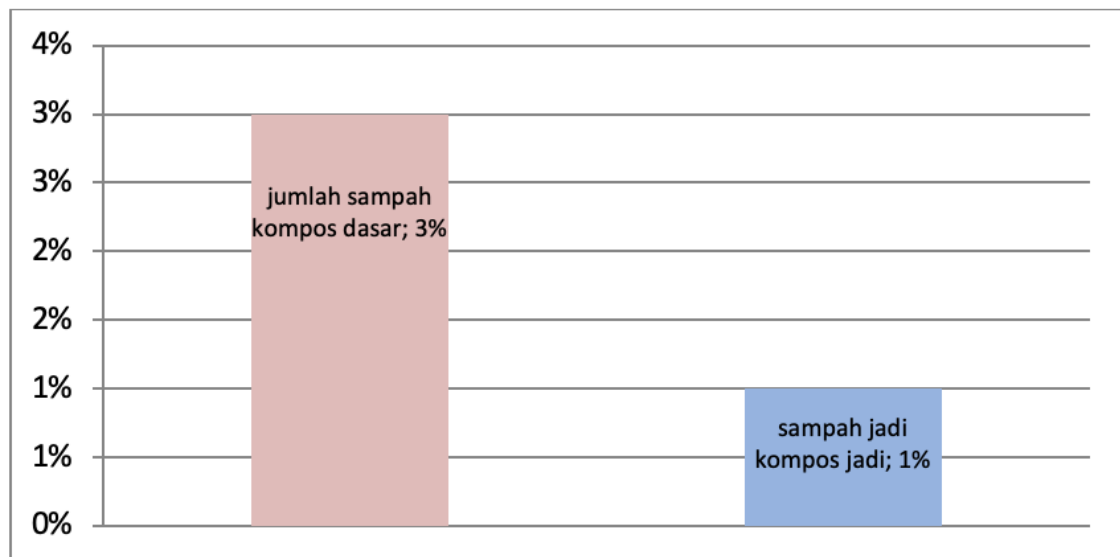


Figure 2. The amount of waste that is composted and finished

From observations at the Payakumbuh's Final Disposal Site, 2023, organic waste is still mixed with non-organic waste to form a Garbage Mountain at the Final Disposal Site, even though organic waste causes death in several animals. With a population of 146,731 people, Payakumbuh, West Sumatera produces waste daily. This area also has minimal infrastructure for waste management, especially household waste. Payakumbuh has an area of 80.43 km², only has 1 unit of Waste Bank, 1 unit, and 20 garbage trucks to serve all cities (Environmental Service, 2021).

This encourages the need for waste utilization in Payakumbuh especially in Tikar Village. This village itself has 1267 households and is a residential area. However, waste management in this area is inadequate; people still throw away waste without sorting organic and non-organic waste. Waste management is crucial and is stated in Regulation No. 18/2008 concerning waste management, which stipulates the principle of Reuse, Reduce, and Recycle (3R), which means reusing waste for various purposes and reducing the amount of waste that causes landfills. For this reason, waste management is needed, especially organic waste.

For 2024, organic waste management will be carried out into eco enzymes because eco enzymes are one solution to the problem of organic waste, especially waste from fruit,

such as fruit peels, which can be used as alternative ingredients for making eco enzymes. Eco enzymes are also included in homemade vinegar, which is reduced from alcohol during the fermentation process of kitchen waste (Rusdianasari et al., 2021). Eco enzymes are organic enzymes that help reduce environmental pollution and function as filters, herbicides, pesticides, air filters, and alkaline soil conditioners (Jumini et al., 2023). This service aims to make a cleaning fluid or disinfectant from eco enzymes to reduce organic waste in Tiakar Village, Payakumbuh.

Based on this background, it is necessary to hold a community service for waste reduction, especially organic waste into eco enzymes, in the form of Household Organic Waste Management Training in Tiakar Village, Payakumbuh. Efforts to empower the community towards waste management, especially organic waste into eco enzymes, can create a healthy, clean, and comfortable environment for the community.

METHOD

The implementation of the training activity for making eco enzymes from Household Organic Waste in Tiakar Village, Payakumbuh, was carried out on 13 August 2024, held at the Tiakar Village Office. The community service activity was attended by citizen representatives in Tiakar Village, East Payakumbuh, West Sumatera. The event was also attended by the head and members of the activity, along with students and the village head apparatus. The stages of the activity start from preparing the activity, collecting materials, and then practicing making eco enzymes. The materials used in the eco enzyme process are brown sugar, water, and organic waste residue. Then, prepare a banner, ask for permission to use the location from the Village Head, and determine the schedule of activities. On the day of implementation, the material was given by the speaker, an environmental activist, and then participants took part in training in the form of training. The sharing method provides training material on how to make eco enzymes. The speaker is from the Payakumbuh Environmental Service, who will provide knowledge about making eco enzymes. In the practical method, the speaker, assisted by the service team, will practice directly making organic waste into the eco enzyme. Participants also asked questions about the manufacturing process and how long it takes. An application is used to determine the amount of raw materials for the eco enzyme manufacturing process. Finally, the extent of the participants' understanding will be evaluated.

RESULTS AND DISCUSSION

Research on the effect of organic materials on the production of eco-enzymes in organic waste in Tiakar, Payakumbuh, was carried out on 13 August 2024 with 24 participants from various fields of science, including Management and Information Technology, as seen in Figure 3.



Figure 3. Community service activities

The activity started at 09:30 am when the eco-enzyme training participants had gathered at the Village Office. Before starting the activity, MC opened with a joint prayer. Then, the head of the service gave a welcoming speech, and the activity was opened, as seen in Figure 4.



Figure 4. Head community service activities

After that, the service activity was filled with a socialization of eco-enzyme making by the speaker. She explained the process of making vegetable and fruit waste into eco-enzymes and their uses. The speaker is an IT alumnus but likes waste processing because she is concerned about the dirty environmental conditions, especially the habits of people who have not sorted their waste. Her love for the environment is marked by her participation in environmental activism, as seen in Figure 5.



Figure 5. Community service speaker

Eco Enzyme is a multi-fungal process involving air, water, and sugar fermentation, with concentrations of 1 kg/gr, 1 liter/ml, and 3 kg/gr. Eco enzyme is made from mild to intense, depending on the type of coke used, and produces an intense aroma and warning for three months in tropical areas and six months in subtropical areas.

Rosukan Poompanvong, the inventor of the eco enzyme formula and the founder of the Agricultural Association in Organic, first discovered eco enzymes. Rosukan has been conducting research since the 1980s; the results have provided practical solutions to environmental problems. For his contribution to the field of agriculture, in 2003, Rosukan Poompanvong received an award from the regional/regional office of FAO (Food and Agriculture Organization), one of the parts of the UN. Then Joean Oon Siew Kee, a Naturopathy Researcher (natural medicine) from Penang, Malaysia, a student of Rosukan, is actively spreading eco enzymes to various countries. Vera Tan, an eco enzyme teacher in Batam and a student of Joean, who is also an environmental activist, is one of those active in spreading eco enzyme in Indonesia. Since 2008, in addition to aiming to preserve the environment and provide benefits to the community, processing wet waste into Eco Enzyme (EE) can also reduce Methane and Carbon Dioxide gas in the air, which significantly affects global warming.

In 1980-83, Rosukan Poompanvong, a researcher at the Agricultural Research Institute, created an environmentally friendly enzyme formula. In 2003, the Food and Agriculture Organization (FAO) and naturopaths supported it. In 2008, an Indonesian researcher named Vera Tan launched an environmentally friendly enzyme. In addition, this research reduces carbon dioxide and greenhouse gas emissions.

With 50% of organic waste in landfills, eco enzymes are essential for reducing plastic waste, plastic lead levels, and releasing methane gas, which is one of the factors causing global warming.

Naturally, methane reservoirs can be found underground and under the seabed, formed through geological and biological processes, where methane gas below the surface is generally frozen like ice, known as methane clathrate or methane hydrate. Methane has a melting point of -161.50°C at a pressure of 1 atm. As a gas, it is flammable in a concentration range of 5.4-17% in air at standard pressure.

This activity conveyed how important it is to make eco enzymes, especially the landslide incident on 20 December 2023 at the Payakumbuh Final Disposal Site. In Figure 6, the resource person explained that with eco enzymes, most of our home products contain synthetic chemicals that harm health and the environment. Discarded product packaging, such as plastic, also pollutes the environment because only a tiny part can be recycled. Eco enzymes are a natural alternative to synthetic hazardous materials at home. Using them, we can reduce synthetic chemical and plastic waste from household product packaging made by manufacturers. This also helps us reduce the burden on the earth while encouraging a lifestyle that uses fewer synthetic chemicals.



Figure 6. Community service activity making eco enzyme

Eco enzyme is made from raw materials such as air, wood, and plastic with a ratio of 1:13, with 60% of the air volume coming from wood. Wood is made from wood, wood, and plastic, and both can be used to make eco enzymes by cutting, slicing, and gluing.

Recommendations for making eco enzymes are that the community should remain consistent in working on eco enzymes to process vegetable and fruit waste according to the availability of each time. It is better to use a variety of vegetable and fruit waste, and each eco enzyme process always uses the "ee" application (eco enzyme calculator) to determine the water content, sugar, and waste that will be used for the eco enzyme process to get better eco enzyme results.

If the container is large and sugar is sufficient, but vegetables are not enough, then we can do it little by little, which consists of preparing a container filled with water and sugar according to the measurements, adding the available organic materials, recording the weight, each time adding organic materials, recording the weight, after the materials meet the measurements, record the date as the date of making eco enzyme. Eco enzyme production includes waste disposal from food, increasing volume, obtaining maximum air content, and obtaining 30% water and 10% air.

Eco enzyme packaging consists of glass, trim, and recommended bottles. A standard meets the requirements of pH 4.0, has a fermented sour aroma, is not contaminated, and is specifically for medicine and agriculture. In this activity, participants are also required to write the date of manufacture and the opening and closing schedule for the eco enzyme fermentation site to avoid mistakes in distinguishing between finished (ripe) and unfinished (unripe) eco enzymes; the results of this eco enzyme can be seen in Figure 7.



Figure 7. Eco enzyme products

The benefits of eco enzymes are used for:

1. Care & Health
2. Macro environment
3. Livestock
4. Agriculture

In this activity, participants were delighted, and eco enzymes from organic waste were produced that could be taken home. Similar activities have also been carried out by (Marlina et al., 2024) (Putra et al., 2023), (Yanti & Awalina, 2021) which helped manage organic waste into Compost and eco enzymes.

CONCLUSION

The results of community service activities show that socialization and training on processing organic waste into eco enzymes can achieve the goals per the objectives of community service activities. This is because eco-enzymes have many benefits, and the community is interested in making them. The suggestions that can be given from this service are that this activity should be continued for the following year so that participants remain consistent in working on eco enzymes; similar and comprehensive activities need to be increased so that organic waste is no longer disposed of at the final disposal site.

ACKNOWLEDGMENT

This activity is an essential independent service scheme activity with a contact number in its implementation from the Faculty of Economics and Business (FEB) of Andalas University. Thanks to all parties who helped make this event a success.

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