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Socialization of Fermentation Technology on Eco Enzymes as Raw Materials for Agro-industry at Muhammadiyah 3 Jember Senior High School

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ABSTRACT

Waste is a daily problem for human life in the world, this is because waste production occurs every day. The increase in the amount of waste per day causes various diseases that will have a more dangerous health impact on both humans and the environment for the next generation. A clean and healthy school environment will support a good teaching and learning process. Muhammadiyah 3 Jember Senior High School is one of the schools that is always developing to become a model school in Jember Regency. However, based on the results of preliminary observations, organic waste management has not been implemented. Eco enzymes are natural multi-purpose liquids, which are fermented from sugar, fruit/vegetable residues, and water. Eco enzymes can be liquids that provide many benefits for households, agriculture, and animal husbandry. Basically, Eco enzymes accelerate biochemical reactions in nature to produce useful enzymes using fruit or vegetable waste. This enzyme from "waste" is one way of waste management that utilizes kitchen scraps for something very useful. The purpose of this community service activity is to introduce fermentation technology to Eco enzymes through increased participation in waste management. This activity was carried out in the form of direct socialization and training to 46 students. The resource person explained the material using the lecture and discussion method, then the participants directly practiced making Eco enzymes. Based on the results of observations of community service activities, students have not implemented organic waste management.

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INTRODUCTION

Waste is a daily problem for human life in the world, this is because waste production occurs every day (Mutaqin, 2018). Waste can be handled with various technologies in developed countries, while the handling and processing of waste is not optimal in developing countries. A serious problem in many big cities in Indonesia is waste (Fau et al., 2020). An increase in the amount of waste per day causes various diseases that will have a more dangerous health impact on both humans and the environment for the next generation (Pranata

et al., 2021). The process of managing waste in the market apart from being an obligation of the manager and cleaning service, also requires the participation of all residents and related parties. The participation of residents in question is participation in the form of reuse, separation of organic and inorganic waste, use of environmentally friendly materials for packaging, processing of waste by composting, and reducing waste production (Arianti et al., 2018). A clean and healthy school environment will support a good teaching and learning process. Muhammadiyah 3 Jember Senior High School is one of the schools that is always developing to become a model school in Jember Regency. However, based on the results of preliminary observations, organic waste management has not been implemented.

Eco enzymes are natural, all-purpose liquids, which are fermented from sugar, fruit or vegetable waste, and water. Eco enzymes were first introduced by Dr. Rosukon Poompanvong who is the founder of the Thai Organic Agriculture Association (Chemical Today Magazine, 2016). Eco enzymes can be liquids that provide many benefits for households, agriculture, and animal husbandry. Eco enzymes accelerate biochemical reactions in nature to produce useful enzymes using fruit or vegetable waste. This enzyme from "waste" is one way of waste management that utilizes kitchen scraps for something very useful (Saifuddin et al., 2021). The characteristics of the Eco enzyme are that it has a strong sweet-sour fermented aroma and a dark brown color. Eco-enzyme fluids are starting to be used as a way to clean rivers in Indonesia from household waste to industrial waste. Eco enzymes are believed to be able to decompose waste which hurts the sustainability of life in rivers. Eco enzyme liquid is also able to suppress the development of E. coli in the waterways (Ginting et al., 2021). Eco-enzyme liquid can be used as a substitute for detergents, soap, shampoo, floor cleaning liquid as well as organic fertilizer (Kurniawan, 2020). Every household can contribute to reducing environmental pollution by making Eco enzymes from leftover household organic materials. In addition, the use of household organic materials can reduce household expenses because they can produce their fertilizer (Pakki et al., 2021).

The waste management system consists of storage, collection, transportation, and waste disposal/processing (Mahyudin, 2014). The value of the waste will increase into a useful product if it is processed by cutting the waste distribution channel to a landfill which can be realized through the manufacture of Eco enzymes which are applied at the household level. So by holding organic waste processing into Eco enzymes in one of the schools, namely Senior High School of Muhammadiyah 3 Jember, it is hoped that it can realize community empowerment through increasing participation in waste management by making Eco enzymes. The waste management system at this school is still not good, as seen from the unavailability of adequate waste bins, organic waste, and non-organic waste are not separated, and waste disposal at TPA uses an open dumping system, no reprocessing has been carried out. Therefore, preventive efforts are needed such as community empowerment through increased participation in waste management with a shared responsibility to reduce waste accumulation and landfill burden. Innovation and creativity in making Ecoenzyme, is here as the best solution for the community in processing organic waste into something more useful. Communities can save more expenses and indirectly help cleaners in sorting household waste into organic and inorganic waste (Harahap et al., 2021).

It is necessary to direct a local organization whose job is to design and carry out collective activities to support these preventive efforts. Community organizations that act as youth forums are expected to be the spearhead of community mobilization so they want to support preventive efforts for community empowerment through increasing participation in waste management by making Eco enzymes at Senior High School of Muhammadiyah 3 Jember, namely a waste management system that does not meet the requirements, there is no separation between organic waste and inorganic and organic waste treatment has not been carried out. The purpose of this community service activity is to empower the community through increasing participation in waste management by making Eco enzymes.

IMPLEMENTATION METHOD

Community service activities will be carried out at Muhammadiyah 3 Jember Senior High School, Sumbersari District, Jember. Participants in this community service activity were students of Muhammadiyah 3 Jember Senior High School. This community service activity will be carried out with a Workshop or Seminar related to Eco Enzymes. Community Service Participants will be invited and coordinated by the Principal to come to the event room. Participants filled out the attendance register and took part in the activity. Participants will practice directing about fermentation technology on Eco enzymes. The target of this community service activity is the students of Muhammadiyah 3 Jember Senior High School, Sumbersari District, Jember. The types of activities in this service are seminars and workshops. The stages for implementing activities include preparation and implementation as well as evaluation of sustainability. Identification of needs for empowerment activities begins with the identification of problems and needs faced by partners. The implementation team then designs activities to help overcome the problems faced by partners. The assistance will be carried out by the implementing team and it is hoped that the assistance from the implementing team

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will make partners consistent in managing organic waste so that it becomes Eco-enzyme products as raw materials for agro-industry.

RESULTS AND DISCUSSION

This service activity was carried out at the Senior High School of Muhammadiyah on 3 Jember. 46 participants attended and enthusiastically participated in the socialization. According to one of the school's teachers, Mr. Suhartono, so far the students have never received Eco Enzyme knowledge as waste management into useful product innovations, so this service which includes counseling and mentoring is very beneficial for the students.

Counseling activities ran smoothly during the event. Before the presentation of the material began, the students first got to know us, academics from Universitas Muhammadiyah Jember and we explained our field of knowledge which came from the Department of Agro-Industrial Technology. Students are given the freedom to ask anything about agriculture because our field of knowledge is also in agriculture so it can help provide solutions to problems experienced by students and the school.

Eco Enzyme is one of the solutions to reduce the burden on Final Disposal Sites where as much as 60% of the waste that is disposed of at Final Disposal Sites is organic waste. The impact of organic waste in landfills is causing bad odors in the environment, reducing the rate of plastic recycling, increasing the risk of landfill explosions, and the decomposition of organic waste to produce methane gas, the cause of global warming. Students are encouraged to listen to explanations regarding Eco Enzymes which can be utilized from school waste, in the form of organic waste. If students and the school can apply waste management by sorting organic and inorganic waste, then they will get used to using waste for useful items, besides that, this creates a clean, healthy, and comfortable atmosphere for school students. This habit is expected during mentoring service activities. Waste management can be done one way by making Eco Enzyme.

Eco Enzyme is a natural alternative to harmful synthetic chemicals at home. Most of the products used in schools are made of chemicals, and products made from synthetic chemicals are harmful to human health and the environment. In addition, the packaging of chemical-based products can pollute the environment because only a small portion is recycled. The way to make Eco Enzyme is by adding 3 parts of organic matter, 1 part of sugar or molasses, and 10 parts of water, then fermenting it for at least 3 months. Muhammadiyah 3 Jember Senior High School students observe the fermentation process and Eco Enzyme products that are more than 3 months old. After the socialization is finished, followed by lunch. The atmosphere was warm when the students enjoyed the meal. Lunch was deliberately held to be an event to get to know each other and exchange information between students.

Figure 1. Submission of material to students

The socialization material presented included the introduction of Eco Enzyme as a multifunctional waste liquid. This material explains the meaning of Eco Enzymes, why it is necessary to use Eco Enzymes, and how to make Eco Enzymes. In addition, this material also explains containers that can be used and cannot be used, water that can be used, vegetable and fruit categories, storage locations for Eco Enzyme ferment solution containers, Eco Enzyme installment tips, harvesting, and packaging, as well as Eco Enzyme good standards.

In addition, the socialization also conveyed the introduction of the application of fermentation technology in the manufacture of Eco Enzymes and their potential use to support Eco Enzymes and the Eco Environment. Fermented products are in the form of biomass products (microbial cells), microbial enzyme products, microbial metabolite products, and bioconversion products through the modification of a compound that is added to the fermentation medium to produce other compounds. The benefits of Eco Enzyme dregs are cleaning toilet drains, car perfume, and organic plant fertilizer. Eco Enzyme can also be used for self-care,

namely as a substitute for toothpaste/paste, shampoo, body wash, mouthwash, toner and face cream. Eco Enzymes can also be used as natural cleaners, namely carbolic acid and natural cleaners, natural liquid soap, cleaning pesticides and germs on vegetables and fruit, natural floor cleaners, natural household cleaners, natural detergents, and softeners.

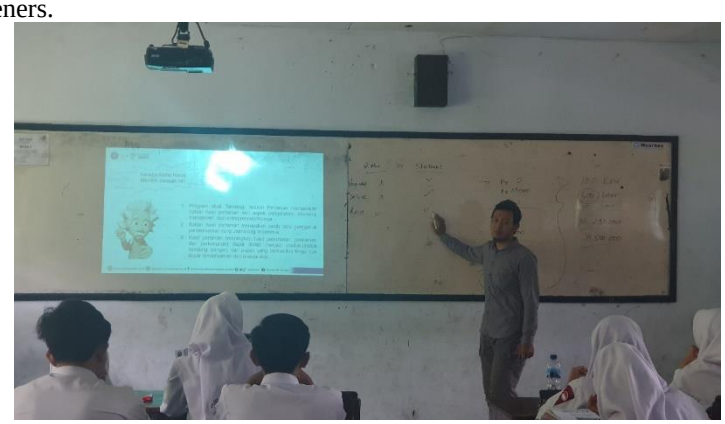

Figure 2. Submission of material to students

Figure 3. Submission of material to students

Figure 4. Submission of material to students

Utilization of Eco Enzyme in agriculture is a natural pesticide herbicide, a natural fertilizer for plants. Eco Enzyme makes farming possible in arid lands. This is because, in the Eco Enzyme product, a biomass product (microbial cell) is obtained which acts as a biological agent. These biological agents can function as natural fungicides and insecticides, potential microbes capable of improving soil conditions that are already saturated with the use of inorganic fertilizers. The biomass contained in Eco Enzyme can also enrich the material contained in the compost when it is used and mixed in organic fertilizers such as compost. Fertilizers and pesticides are applied with a water ratio of 1: 1000 for fertilizers, directly applied to the soil, and for pesticides directly applied to places affected by pests. Students listen to Eco Enzyme's explanation from start to finish with enthusiasm. This can be seen from several students who asked several questions.

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CONCLUSION

Socialization and mentoring activities for students related to Eco Enzyme can add new insights and knowledge to students. So far, students are aware of the importance of waste management, but no concrete waste management program has been carried out. For more optimal benefits, students can try practicing at home as a practice, and the school can encourage students to implement a school organic waste management program with Eco Enzyme.

REFERENCES

[1]. Arianti, N. N., Yuliarti, E., & Marlin. (2018). Penerapan Prinsip 5R (Reduce, Reuse, Recycle, Replant Dan Replace) Sebagai Upaya Efektif Menangani Masalah Sampah Rumahtangga. Dharma Raflesia : Jurnal Ilmiah Pengembangan dan Penerapan IPTEKS, 13(1), 54–63. https://doi.org/10.33369/dr.v13i1.4131

[2]. Chemical Today Magazine. (2016). Eco enzymes –an organic cleaning solution. https://www.worldofchemicals.com/media/eco-enzymes-an-organic-cleaning-solution/10663.html

[3]. Fau, A., Sarumaha, P. C., & Manaraja, D. M. (2020). Pengelolaan Sampah Di Tpa Teluk dalam Kabupaten Nias Selatan Menjadi Pupuk Organik (Merk Multi-Vit). Jurnal Education and Development, 8(3), 92–92. http://journal.ipts.ac.id/index.php/ED/article/view/1913

[4]. Ginting, N., Hasnudi, H., & Yunilas, Y. (2021). Eco-enzyme Disinfection in Pig Housing as an Effort to Suppress Esherechia coli Population. Jurnal Sain Peternakan Indonesia, 16(3), 283–287. https://doi.org/10.31186/jspi.id.16.3.283-287

[5]. Harahap, R. G., Nurmawati, Dianiswara, A., & Putri, D. L. (2021). Pelatihan Pembuatan Eco-enzyme sebagai Alternatif Desinfektan Alami di Masa Pandemi Covid-19 bagi Warga Km.15 Kelurahan Karang Joang. Sinar Sang Surya (Jurnal Pusat Pengabdian Kepada Masyarakat), 5(1), 67–73. https://ojs.ummetro.ac.id/index.php/sinarsangsurya/article/view/1505/980

[6]. Kurniawan, A. (2020). Eco Enzyme, Cairan Ajaib Hasil Fermentasi Sampah Organik yang Multiguna. https://klikhijau.com/eco-enzyme-cairan-ajaib-hasil-fermentasi-sampah-organik-yang-multiguna/

[7]. Mahyudin, R. P. (2014). Strategi Pengelolaan Sampah Berkelanjutan. EnviroScienteae, 10(1), 33–40. https://ppjp.ulm.ac.id/journal/index.php/es/article/view/1962/1709

[8]. Mutaqin, A. Z. (2018). Pengelolaan Sampah Organik Rumah Tangga dalam Penanggulangan Pencemaran Lingkungan di Desa Bumiwangi Kecamatan Ciparay Kabupaten Bandung. Geoarea, 1(1), 32–36. https://ejournal.unibba.ac.id/index.php/Geoarea/article/view/90/122

[9]. Pakki, T., Adawiyah, R., Yuswana, A., Namriah, Dirgantoro, M. A., & Slamet, A. (2021). Pemanfaatan Eco-Enzyme Berbahan Dasar Sisa Bahan Organik Rumah Tangga dalam Budidaya Tanaman Sayuran di Pekarangan. Prosiding PEPADU 2021: Seminar Nasional Pengabdian kepada Masyarakat, 3(November), 126–134. https://jurnal.lppm.unram.ac.id/index.php/prosidingpepadu/article/view/385

[10]. Pranata, L., Kurniawan, I., Indaryati, S., Rini, M. T., Suryani, K., & Yuniarti, E. (2021). Pelatihan Pengolahan Sampah Organik Dengan Metode Eco Enzym. Indonesian Journal Of Community Service, 1(1), 171–179. http://ijocs.rcipublisher.org/index.php/ijocs/article/view/23

[11]. Saifuddin, S., Syahyadi, R., Nahar, N., & Bahri, S. (2021). Peningkatan Kualitas Utilization of Domestic Waste for Bar Soap and Enzym Cleanner (Ecoenzym) Sebagai Bahan Baku Pembuatan Sabun. Jurnal Vokasi, 5(1), 45. https://doi.org/10.30811/vokasi.v5i1.2158