

## ECOENZYME IS AN ANTI-BACTERIAL MATERIAL FOR MAKING MULTI-PURPOSE SOAP FROM USED COOKING OIL (CASE STUDY : IMPLEMENTATION OF THE CSR PROGRAM PT PERTAMINA PATRA NIAGA DPPU ADI SUMARMO)

**Karin Alifia RACHMADANI<sup>1</sup>, Aji Nuafal SYAFIQ<sup>2</sup>, Siti FATONAH<sup>3</sup>, Anggit WIJAYANGGO<sup>4</sup>**

<sup>1,2</sup>Biologi, Muhammadiyah Lamongan University, Indonesia

<sup>3</sup>Jr. Spv. RSD, PT Pertamina Patra Niaga DPPU Adi Sumarmo

<sup>4</sup>CDO, PT Pertamina Patra Niaga DPPU Adi Sumarmo

Corresponding Author: Karin Alifia RACHMADANI

E-mail: [karinalifia28@gmail.com](mailto:karinalifia28@gmail.com)

Volume: 4

Number: 4

Page: 971 - 976

### Article History:

Received: 2023-03-26

Revised: 2023-05-15

Accepted: 2023-07-15

### Abstract:

Used cooking oil comes from the process of frying with the same cooking oil over and over again. Using used cooking oil can pose a danger to the human body, and the continuous disposal of waste cooking oil is detrimental to the environment and human survival. Making soap in Sobokerto District, Boyolali Regency with the addition of Eco Enzyme as an anti-bacterial additive, where eco enzyme itself has chemical properties that can be used as multi-purpose soap. Eco Enzyme is the result of fermentation of organic kitchen waste such as vegetable and fruit waste. Eco Enzyme raw materials have many benefits that are multiplied and can be used in everyday life in liquids that are fermented to produce acidic chemical compounds. Used cooking oil obtained from Sobokerto Village, Ngemplak District, Boyolali Regency produces 50 kg. The multipurpose soap produced by the women of Sobokerto Village produced 210 bottles. packaging per bottle of 330 ml - period December 2022-March 2023. Cooking oil is a form of vegetable oil, in the form of glyceride compounds from various fatty acids present in the glycerides themselves. The results of the informants used multi-purpose soap, from their smell, said that it smelled good with an orange color and that the consistency of the liquid that looks like liquid has foam that foams and there is one informant who said it was foaming, the effectiveness of the mat and some said that the mat did not, the effect of using it doesn't feel hot and not itchy.

**Keywords:** Cooking Oil, Eco Enzyme, Ngudi Makmur

Cite this as: RACHMADANI, K.A., SYAFIQ, A.N., FATONAH, S., WIJAYANGGO, A. (2023). "Eco Enzyme as an Anti-Microbial Active Ingredient for the Manufacture of Multipurpose Soap From Used Cooking Oil (Case Study: Implementation of the CSR Community Development Program For Utilization of Waste Cooking Oil by KWT Ngudi Makmur Foster Partners PT Pertamina Patra Niaga DPPU Adi Sumarmo)" International Journal of Environmental, Sustainability and Social Science , 4 (4), 971 - 976.



## INTRODUCTION

The people in Boyolali Regency, especially in Sobokerto Village, Ngemplak District, are dominated mainly by homemakers 372 who work at home and are responsible for the needs of their household BPS data( 2018). Household activities must be kept from meeting basic needs, namely eating. Homemakers prepare food by cooking in the kitchen, which is closely related to cooking oil. The use of cooking oil for households in Indonesia is 3.66 liters BPS data (2022); in Central Java, cooking oil from the existing data is One of the needs of homemakers cooking oil.

Cooking oil is refined from vegetable oil used to fry food. Almost every homemaker activity of frying food in the kitchen because the fried food is consumed, not looking at it in terms of age; in other

words, all ages consume fried food (Putra *et al.*, 2016). Used cooking oil is cooking oil resulting from frying, used repeatedly using the same cooking oil. The use of cooking oil continually can affect the quality of cooking oil and nutrition in food. So, if food from fried cooking oil is consumed, it can cause disease in our bodies. Another problem faced is that the disposal of used cooking oil in the environment continuously can damage or pollute the environment (Pujati, 2018); this happened in Sobokerto Village, where used cooking oil was thrown away without any processing.

Disposal of waste cooking oil haphazardly can result in soil and water pollution. Soil pollution occurs because causing the soil pores to close and the ground gets complicated will disturb the ecosystem. While water pollution occurs because the ingress of sewage into the water results in decreased water function, so no longer able to support the activity of humans and causes them to arise clean water supply problems. Part of the most significant cause of water pollution is liquid waste from industry and solid waste in the form of domestic garbage (Rumaisa *et al.*, 2019).

Eco Enzyme is processed from organic waste, which we usually throw in the trash (Warsito *et al.*, 2021). So Eco Enzyme results from the fermentation of organic kitchen waste such as vegetable and fruit waste. Eco Enzyme raw materials have many benefits that are multiplied and can be used in everyday life in fermented liquids to produce acidic chemical compounds (Pranata *et al.*, 2021), one of which is as a multipurpose soap.

The results of the product have been studied by killing gram negatives and viruses with 60% (12.5% level) can kill germs. This waste treatment system was first discovered in 2003 by a doctor from Thailand who received an FAO award (Junaidi *et al.*, 2021)

Nowadays, processing organic waste in society is still concentrated in the final approach, namely with (end-of-pipe), waste is collected, transported, and disposed of at the waste processing site. People still need to learn that organic garbage can still be used for health and children's health. A garbage heap with a large volume in the location of the place final waste processing has the potential to release methane gas which increases greenhouse gas emissions glass and contributes to global warming (Septiani *et al.*, 2021).

There needs to be a solution to the problems faced by the community regarding used cooking oil waste and efforts to prevent waste cooking oil from polluting the environment and waters. One way is by reprocessing used cooking oil into a product that can be utilized by the community that has economic value and empowering homemakers in processing oil into products that are useful in everyday life (Rahayu *et al.*, 2020 dan Wijaya *et al.*, 2014). One alternative for using used cooking oil is making soap. Utilizing Eco Enzyme as a natural raw material to make multipurpose soap products.

Making soap requires one of the innovations that are easy to use using used cooking oil and Eco Enzyme. In addition, soap produced from processing using cooking oil and Eco Enzyme has economic value, so it has the potential to be developed among the community. It can increase the source of income for homemakers, especially in Sobokerto Village, Ngemplak District, and Boyolali Regency.

This was responded to by PT Pertamina Patra Niaga DPPU Adi Sumarmo through the CSR Community Development program as a form of social and environmental responsibility in the ring 1 area of the company's work operation unit by assisting KWT Ngudi Makmur, whose members consist of homemakers in the Derivatives Hamlet, Sobokerto Village, Ngemplak District, Boyolali Regency. Community empowerment is carried out by using cooking oil waste to make multipurpose soap which can be used to wash household furniture, dirty clothes, and dirty floors. This aims to educate the public to participate in protecting the environment from the dangers of used cooking oil waste and to be able to become a means for increasing income from the sale of multipurpose soap from environmentally friendly products.

## METHODS

**Table 1.** How to Make Multipurpose Soap Made From Used Cooking Oil and Eco Enzyme

Tool	Material	Procedure
Plastic teapot	60 ml Eco Enzyme	1. Add cooking oil and heated coconut oil
Plastic gloves	1 sendok spatula plastic Tc	2. Add distilled water + KOH + Citric Acid, and stir in container one until it cools down
Hand blender	Dye	3. Put used cooking oil and oil into one blender container until mixed
Wooden spatula	Deodorizer	4. Container 1 is steamed with boiling water
Plastic spatulas	5-gram Citric acid	5. Put container one material into the plastic paint bucket, wait three days
Stove	130 ml Distilled water	6. Then the ingredients in the bucket are added coloring and fragrance
Pan	100 ml Coconut oil	7. Put the soap in a 330 ml bottle
Bottle	116-gram KOH	
Scissors	400 ml Cooking oil	
Plastic paint bucket 25 kg		

**RESULT AND DISCUSSION**

There is a community empowerment program carried out by PT Pertamina Patra Niaga DPPU Adi Sumarmo through assistance to the Women Farmers Group / KWT Ngudi Makmur in the Turunan Hamlet, Sobokerto Village, Ngemplak District, Boyolali Regency through the use of used cooking oil for making multipurpose soap (washing household furniture), washing clothes, cleaning floors, and so on).

Utilization of used cooking oil as an effort to protect the environment from the dangers caused by used cooking oil. Processed waste cooking oil products are an effort to increase the community's income, especially for women who are members of KWT Ngudi Makmur. During the multipurpose soap production period from December 2022-March 2023, as many as 50 kg of used cooking oil produced 210 bottles of multipurpose soap with @330 ml packaging, which were sold both online through marketplaces and offline.

Eco Enzyme is processed from organic waste that we usually throw in the bin waste (Warsito et al., 2021). So Eco Enzyme results from the fermentation of organic kitchen waste such as vegetable and fruit waste. Material Baku Eco Enzyme has many benefits multiplied and can be utilized in fermented liquid daily life to produce acidic chemical compounds (Pranata et al., 2021)

Ecoenzyme content report in his research that the content of eco enzyme is acetic acid (H3COOH) which can kill germs, viruses, and bacteria. Besides that, eco enzyme too Contains Lipase, Trypsin, and Amylase, capable of preventing pathogenic bacteria. In research, others mentioned that eco enzymes could kill E. coli, S. aureus, S. Typhi, C. Albicans, and viruses. Selection of eco enzymes as essential ingredients for making laundry soap hand, because the material is accessible, can be obtained by using organic kitchen waste from scraps, vegetables, and fruits as well as the content of eco enzymes that can kill germs, viruses, and bacteria (Iswati et al., 2021).

Cooking oil is a form of vegetable oil in the form of glyceride compounds from various fatty acids present in the glycerides themselves. In food technology, oil, and fat play an essential role because they have a high boiling point (about 200°C), so they can be used to fry food so that the fried ingredients lose most of the water they contain and become dry. Oils and fats also give a specific savory taste to oil which is different from the savory protein and gives a specific aroma (Putra et al., 2012)

Used cooking oil can be used through a purification process to be reused as a raw material for oil-based products such as soap (Naomi et al., 2013). Soap is a surfactant used with water to wash and clean stains. When applied to a surface, soapy water effectively binds particles in suspension, easily carried by clean water. Soap is produced from the hydrolysis of oil or fat into free fatty acids and glycerol, followed by saponification (Fessenden & Fessenden, 1997).



Figure 1. The process of making Eco Enzyme



Figure 2. The process of making soap is versatile



Figure 3. A store selling multipurpose soap and multipurpose soap products

Table 2. Perception Test Table

Parameter	Results		
	Source person 1	Source person 2	Source person 3
Smell	Fragrant	Fragrant	Fragrant

Color	Orange	Orange	Orange
Liquid consistency	Liquid	Liquid	Liquid
Foam	Less foamy	Foamy	Foamy
Effectiveness	Not a doormat	Doormat	Doormat
Usage effect	Does not itch and does not feel hot	Not dry and not hot	Not dry, not hot, and not itchy

The results of the informants who used multipurpose soap, from their smell, said that it smelled good with an orange color and that the consistency of the liquid that looks like liquid foam that foams; there is one informant who said it was foaming; the effectiveness of the mat and some said that the mat did not, the effect of using it does not feel hot, does not feel itchy and not dry on the skin.

## CONCLUSION

The conclusion from the activities carried out in Sobokerto Village, Ngemplak District, Boyolali Regency, is that homemakers already know the proper process of processing used cooking oil and making Eco Enzyme from vegetable waste. This activity provides innovation, information addition, knowledge, and residents' skills in processing organic waste and other natural plants that are commonly found in the surrounding environment as health products that are environmentally friendly and useful. The results of the informants who used multipurpose soap, from their smell, said that it smelled good with an orange color and that the consistency of the liquid that looks like liquid foam that foams; there is one informant who said it was foaming; the effectiveness of the mat and some said that the mat did not, the effect of using it does not feel hot, does not feel itchy and not dry on the skin.

## REFERENCES

- Fessenden, R. J., & Fessenden, J. S. (1997). *Kimia Organik Jilid I Edisi Kedua*. Jakarta: Binarupa Aksara.
- Iswati, R. S., Hubaedah, A., & Andarwulan, S. (2021). Pelatihan Pembuatan Sabun Cuci Tangan Anti Bakteri Berbasis Eco Enzym dari Limbah Buah-Buahan dan Sayuran. *Bantenese: Jurnal Pengabdian Masyarakat*, 3(2), 104-112. <https://doi.org/10.30656/ps2pm.v3i2.4007>
- Junaidi, R. J., Zaini, M., Ramadhan, R., Hasan, M., Ranti, B. Y. Z. B., Firmansyah, M. W., ... & Hardiansyah, F. (2021). Pembuatan Eco-Enzyme sebagai Solusi Pengolahan Limbah Rumah Tangga. *Jurnal Pembelajaran Pemberdayaan Masyarakat (JP2M)*, 2(2), 118-123. <https://doi.org/10.33474/jp2m.v2i2.10760>
- Khuzaimah, S. (2018). Pembuatan Sabun Padat dari Minyak Goreng Bekas Ditinjau dari Kinetika Reaksi Kimia. *Ratih: Jurnal Rekayasa Teknologi Industri Hijau*, 2(2), 11.
- 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.
- Pujiati, A., & Retariandalas, R. (2019). Utilization of domestic waste for bar soap and enzyme cleanner (ecoenzyme)[pemanfaatan limbah rumah tangga untuk pembuatan sabun batang dan pembersih serbaguna (ecoenzym)]. *Proceeding of Community Development*, 2, 777-781. <https://doi.org/10.30874/comdev.2018.489>
- Putra, A., Mahrдания, S., Dewi, A., & Saptia, E. (2012). Recovery Minyak Jelantah Menggunakan Mengkudu Sebagai Absorben. In *Prosiding Seminar Nasional PERTETA* (pp. 585-589).
- Putra, G., Wartini, N. M., Wrasati, L. P., & Yoga, I. W. G. S. (2016). Penyuluhan dan pelatihan pembuatan sabun aroma terapi dari minyak kelapa pada KWT "Wiguna Mekar" di Desa

Angkah, Kecamatan Selemadeg Barat, Kabupaten Tabanan. *Program Studi Teknologi Industri Pertanian Fakultas Teknologi Pertanian. Universitas Udayana.*

Rahayu, S., Aliyah, H., Tukasno, T., Pratiwi, M. I., & Solikah, B. (2020). Pemanfaatan Minyak Jelantah dan Arang Kayu untuk Membuat Sabun Daur Ulang. *Jurnal Pengabdian KITA*, 3(1).

Septiani, U., Najmi, N., & Oktavia, R. (2021, October). Eco Enzyme: Pengolahan sampah rumah tangga menjadi produk serbaguna di Yayasan Khazanah Kebajikan. In *Prosiding Seminar Nasional Pengabdian Masyarakat LPPM UMJ* (Vol. 1, No. 1).

Warsito, H., Santoso, A., & Budiati, T. (2021, November). PRODUKSI BAHAN PEMBERSIH (MULTIPURPOSE CLEANER) DARI LIMBAH SAYURAN MENGGUNAKAN TEKNOLOGI ECO ENZYME METODE WARSITO. In *Prosiding Seminar Nasional Terapan Riset Inovatif (SENTRINOV)* (Vol. 7, No. 3, pp. 474-481).

Wijaya, J., Rohanah, A., & Rindang, A. (2014). Pengolahan minyak jelantah menjadi sabun batang dengan ekstrak kunyit, lidah buaya, dan pepaya. *Jurnal Rekayasa Pangan dan Pertanian*, 2(4), 139-145.

Windarto, A. P., Hartama, D., Wanto, A., & Parlina, I. (2018). Pelatihan Pemanfaatan Mendeley Desktop Sebagai Program Istimewa Untuk Akademisi Dalam Membuat Citasi Karya Ilmiah. *AKSIOLOGIYA: Jurnal Pengabdian Kepada Masyarakat*, 2(2), 145-150.

<https://doi.org/10.30651/aks.v2i2.1319>