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# Household Organic Waste Processing to Produce Eco Enzym at Kartosuro Christian Protestant Church (Gkpo), Sukoharjo, Central Java, Indonesia

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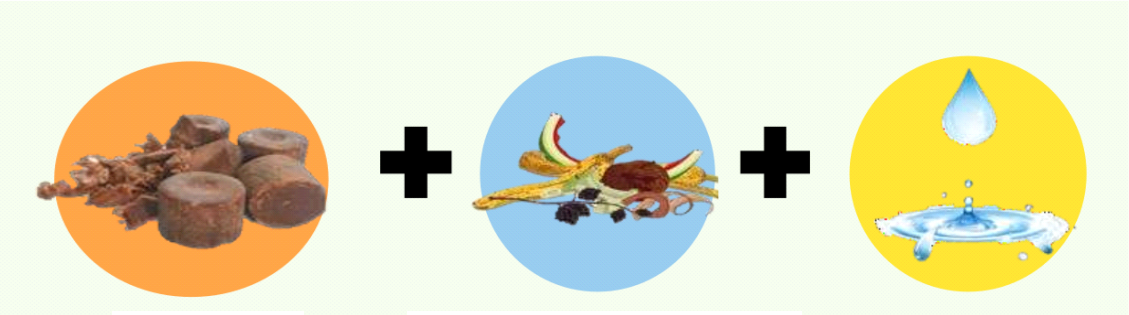
A B S T R A C T

In counseling in the form of community service for the Oikumene Protestant Christian Church (GKPO) Kartosuro which was carried out by a lecturer in the Environmental Engineering Study Program, Faculty of Engineering, Christian University of Technology Solo regarding the use of organic waste to produce eco enzymes, giving hope and benefits about utilizing good and sustainable organic waste. Processing organic waste from home also contributes to mothers in their respective households each to support the local government program of Sukoharjo Regency in controlling waste generation and producing eco enzyme products that directly benefit their respective families. The result of this community service activity is that PA GKPO Kartosura mothers received information on how to process organic waste into eco enzyme.

## INTRODUCTION

Waste management is a series of actions consisting of collecting, transporting, processing, recycling or disposing of waste material that aims to reduce the impact on health, the environment and beauty (Banowati). The benefits of organic and inorganic waste for the community provide additional income. Organic waste can be utilized in the form of goods that can be recycled in the form of compost (Maulitia et al.) and inorganic waste can be utilized in the form of goods that can be resold, for example used bottles, used cloth, used tires, paper, boxes, glasses and other items that can be recycled. useful (Ridwan et al.). Organic waste from household activities in the form of used vegetables, fruits, food waste can be used to produce products that are very beneficial to society and the environment. The product is called eco enzyme. (Budiyanto et al. ),(Septiani et al.),(Dewi and Sutama).Eco enzyme is a versatile liquid which is the result of fermentation of: Brown sugar, leftover fruit and vegetables and water.(Sudaryantiningsih)



| Brown sugar | leftover fruit and vegetables | water |
|---|---|---|
| 1 ( kg/gram) | 3 (kg/gram) | 10 (liter/ml) |

**Figure.1 The three main ingredients for making eco enzyme**

The type of organic waste that can be processed to become eco enzyme is leftover raw vegetable or fruit waste. The fermentation process which can produce alcohol and acetic acid can only be applied to plant-based waste containing carbohydrates (sugar). Meanwhile, organic waste that is not suitable for use in the process of making eco enzymes is; dried leaves, banana leaves and stems, skin and coconut shell, sugarcane bagasse and coconut, pineapple skin and waste, cassava peel and waste, mango and durian. Also kitchen waste that has been exposed to oil or that is already in landfills (Prasetio et al.).

To make eco enzyme, the steps are as follows: Clean the place for making eco enzyme from used soap and chemicals, measure the volume of the container, put 60% clean water in the container, add palm sugar/Javanese sugar according to a dosage of around 10% of the weight water, add organic waste in the form of fruit and vegetable waste as much as 30% by weight of water and stir until completely mixed, the container is tightly closed and labeled with the date of manufacture and harvest date, In week 1, open the lid of the container to remove the gas formed and stir it in day 7, 30 and day 90. (Himma).

The eco enzyme that is formed is useful for agricultural activities, namely as a plant fertilizer to support organic farming. (Kustiana). Another benefit of eco enzymes is for air purification, cleaning fluids, fruit and vegetable washing, skin health and water purification. (Nurfajriah et al.), (Team CNN).

The Oikumene Protestant Christian Church (GKPO) Kartosuro, strives to become an environmentally friendly church (green Church), to support the government's efforts to reduce carbon emissions and environmental pollution, both air, water and soil pollution. One of the efforts made is processing organic waste into eco enzymes which can be carried out by all the families of the members of the GKPO Kartosuro congregation. For this reason, a collaboration was established between the Department of Environmental EngineerinG, Faculty of Engineering, Solo Christian University of Technology and the GKPO Mothers' prayer group to provide training in making eco enzyme based on organic waste produced from the kitchens of women members of the GKPO Kartosura church.

## IMPLEMENTATION AND METHODS

This activity is carried out by starting from the planning, implementation and details as well as activity feedback. This activity was carried out in the form of training and counseling for the GKPO Kartosuro women's prayer group.

1. Planning
   In planning, a schedule and materials for activities are prepared, carefully calculating the funds and location of the participants. We chose Eco Enzyme as the topic of this dedication, because the organic waste produced so far is disposed of and transported to the final Mojosongo landfill. With this Eco Enzyme, organic waste can be reduced.
2. Implementation
   It is planned that this activity will be held twice, namely on June 10 2023 and December 2023. Participants are expected to make Eco Enzyme and share their experiences with other participants.
3. Details of Activities
   Training This training activity will be carried out through direct counseling to the Oikumene Protestant Christian Church (GKPO).
4. Feedback
   After the counseling on June 10, 2023, there will be an agenda for counseling about advanced eco enzymes and the utilization of organic waste into compost with environmentally friendly and effective technology, namely Biopori infiltration holes. With biopori infiltration holes, waste can be processed to produce compost, fertilize plants, harvest rainwater by LRB and utilized during the dry season and can control floods and rainwater runoff that inundate the GKPO Church's yard.

## RESULTS AND DISCUSSION

The results of the community service activities carried out on June 10 2023 were enthusiasm and passion for learning and practicing how to make eco enzymes in their respective households. This can be seen from the question and answer session where there were several mothers who asked seriously to get information on how to make eco enzyme properly and correctly. Then there was a suggestion that another meeting be scheduled in the form of community service to make eco enzyme to review practices carried out at their respective homes. - Each woman from the Oikumene Protestant Christian Church (GKPO) prayer group. Then there was a suggestion for how to use eco enzyme products for skin beauty products so that mothers look beautiful because their skin is smooth and fresh.

**Figure.2 Counseling activities for the women of the Oikumene Protestant Christian Church (GKPO) prayer group**

Other information obtained and learned by the women of the Oikumene Protestant Christian Church (GKPO) prayer group from community service is that Eco enzyme is an environmentally friendly product and is widely used in various fields and can be easily practiced. Eco enzyme is environmentally friendly, because it can be used as a cleaner, because it is very acidic. It can be used as an air purifier, river water and polluted soil. Eco enzyme can be used for food preservatives because of its propionic nature and high acid content so it can prevent microbial growth. Acetic acid in eco enzyme can destroy organisms, so it is often used as an insecticide or pesticide.(TOKPOHOZIN et al.),(Arifin et al.), (Tang and Tong) and (Rasi et al.).

It is hoped that the existence of counseling activities on the use of organic waste to produce eco enzymes can provide motivation for GKPO Kartosura church members only but can provide benefits for the wider community so that they can participate in managing waste from their respective homes. This effort will greatly assist the government's efforts area of Sukoharjo Regency in creating Sukoharjo Regency as an environmentally friendly city as well as an increasingly advanced and dignified city of culture and education.

## CONCLUSIONS AND RECOMMENDATIONS

The community service that has been carried out provides an understanding that organic waste can provide benefits to the community, especially providing education for mothers who prepare nutritious meals for the family every day, but can also play a role in supporting local government efforts to reduce waste generation from households by processing it into a very useful product. useful, namely eco enzyme. The role of mothers should continue to be nurtured and developed and supported in the form of counseling and awards from various parties, especially the local government. The advice that can be given is that efforts to empower women in processing waste from home need to be supported by all family members, so that they continue to work hand in hand in processing waste, especially in processing waste into eco enzymes. Environmental Engineering, Faculty of Engineering, Solo Christian University of Technology.

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