The Production of Eco-enzyme Multipurpose Liquid-based Soap to Improve Household Economic Empowerment

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Abstract. In the 1980s, a from Thailand, Dr. Rosukon Poompanyong, conducted research about eco-enzymes. The result showed that eco-enzyme has so many benefits. One of the benefits of the eco-enzyme is for health and beauty by producing a liquid soap made of the eco-enzyme. The manufacturing of soap made from the eco-enzyme is a form of community service to improve economic empowerment and manage the household organic waste of the Family Welfare Programme (hereinafter referred to as PKK) members RT 03/RW 014, Serengan, Serengan, Surakarta in 2023. This soap-making training is a continuity of the two previous community services, which LP3M UMY also funded. The purpose of community service in making liquid soap made from the eco-enzyme is to improve economic empowerment and manage household organic waste. Because the eco-enzyme can be made out of household organic waste, the development result can be developed into products that can be economically traded. The result of community service in making liquid soap not only can be useful for daily use but also can be sold to increase household income. The activity was carried out by directly making liquid soap with PKK members at RT 003/RW 014, Serengan, Serengan, Surakarta. Community service in making liquid soap cannot only improve the economy of households and groups but also can add new insight for the PKK members regarding the use of eco-enzyme as the ingredient of liquid soap. In the future, community service based on the manufacture of eco-enzymes will continue to develop products like liquid detergent, shampoo, and organic fertilizer so that it is beneficial not only for daily life but also for the environment.

Keywords: soap, eco-enzyme, economic value

1 Introduction

Soap is one of human’s daily needs, from bathing to washing, because its function is to clean up things like body parts and tools from dirt and germs. Soap also has a fragrant aroma that is calming. Nowadays, there are many kinds of soaps in the market with various brands and fragrances. Soap can be divided into two types: beauty soap and health soap. The soap made from eco-enzyme will be beneficial for both beauty and health. This is because the eco-enzyme has a characteristic that can benefit cleanliness and health.

The partnership of this community service is members of PKK in Serengan, Serengan, Surakarta. In daily life, the PKK members have many households’ organic wastes that have not been used economically. If household organic waste is not managed well, it will be harmful to the environment. The increasing volume of waste from day to day will increase the problem locally and nationally.

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This soap-making training is a continuity of the two previous community services, namely making eco-enzyme multipurpose liquid and making beauty and health soap made from the eco-enzyme. These activities were entirely funded by the community service agency (LRI UMY). With this community service activity, we hope that it will not only benefit the environment but, in the future, it will also be economically beneficial for members of PKK.

In the future, the researchers will develop the result of the training in soap-making made from eco-enzyme to become various goods that provide benefits not only for humans but also for the environment. Therefore, Abdimas of making eco-enzyme-based liquid soap for the PKK members is the third step and the basis for further development of eco-enzyme-based products.

According to Nazim & Meera (2013), complex liquid products from fermented fresh kitchen waste in the form of fruit and vegetable peels, sugar, and water can be called waste enzymes. Fermented products can be used inside and outside the house.

The application of the use of eco-enzyme is also used to overcome pollution of household wastewater or industrial sludge and improve water quality (Tang & Tong, 2011) in testing sewage treatment plants at Curtin University, Sarawak Campus; Nazim and Meera (2013) and Nazim and Meera (2017) on gray water in India; Arun & Sivashanmugam (2015a) conducted research to dissolve the active precipitate by varying the waste, and then Tokpohozin et al. (2015) used eco-enzyme liquid for the development of fish feed.

A research by Tang & Tong (2011) shows that eco-enzyme solutions are used as additives in shampoo and detergent products. Several other studies have also shown how this eco-enzyme liquid is used for the development of soap products, such as Jadid’s research (2022) making this antiseptic soap taking the name Mizella with an eco-enzyme solution; Kusumawati and Putri (2022) made eco-enzyme soap made from household organic waste in the PKK Group, Baturasi Village, Demak; Firman Pribadi et al. (2022) make beauty soap using eco-enzyme raw materials; Yuniati et al. (2022) made soap from used cooking oil and eco-enzyme liquid.

Based on the research and empirical evidence above, one of the solutions for organic waste is to turn it into eco-enzyme multipurpose liquid and how to utilize eco-enzyme liquid to become useful products for everyday life, such as making liquid soap made from eco-enzyme. The other benefit of making this liquid soap is an increase in the economy for the family.

In the future, eco-enzyme liquid can also be developed to manufacture detergent soap or organic shampoo. Organic detergent and shampoo will provide benefits for environmental preservation because the remaining waste of chemical-based detergent and shampoo is currently very damaging to the environment and takes a long time to decompose. Since eco-enzyme is useful for daily life and the environment, this community service is also intended to develop this eco-enzyme research to develop other products that use the basic ingredients of eco-enzyme liquid. So, in the future, organic products made from eco-enzyme can be a solution for environmental problems and also can increase household income.

2 Methodology

The process for making eco-enzymes can be seen in the Eco-enzyme Nusantara (2000) module. Furthermore, the method of implementing this community service activity will be carried out by providing face-to-face training to members of PKK in several
meetings, as follows: the first meeting is making eco-enzyme, and the next meeting is training on how to use eco-enzyme by making liquid soap.

3 Results and Discussion

The process of making soap was carried out through several stages. First, the process of making eco-enzymes can be seen in the Eco-enzyme Nusantara module (2000). The second meeting was training in making liquid soap. The process of making soap was carried out through the following stages:

The first stage determined the raw materials to be used and the size composition of each of these raw materials.

In the second stage, the community service team made the liquid soap with three representatives of PKK members. In this initial process, several liters of soap are made as an experiment. Furthermore, the three women who helped in the initial soap-making process will become tutors and practice how to make soap for PKK members.

The final stage of the activity was carried out by gathering all members of PKK at one of the member’s houses for the soap-making process together. In this stage, the members were divided into two groups to make two different fragrances. The process of making soap is led by members who represented the soap-making in the second stage. In this activity, the members made the soap by mixing all the ingredients and following the process steps until they finally packed the soap.

Here are the tools needed to make eco-enzyme soap:

- Goggles or Lab glasses are used to protect the eyes.
- Rubber gloves as hand protection
- Masks protect themselves from KOH vapor
- Electric scales
- Hand blenders
- 2 measuring cups for mixing made of heat-resistant plastic
- Plastic container that is thick enough
- Spatula
- Soap molds

In the process of making this soap, the makers are recommended to wear long-sleeve clothes for protection from any harmful materials.

Ingredients

The following are the ingredients for eco-enzyme soap and the dosage that will be used in this activity:

- Coconut Oil: 900 grams
- Palm Oil: 900 grams
- Olive Oil: 1200 grams
- KOH: 432 grams
- Distilled Water: 780 grams
- Enzyme Eco Liquid: 360 grams

Steps of making

To measure the ingredients above, the researcher calculated the ingredients using the soap calculator via soapee.com. The soap calculator will automatically measure how many
ingredients are needed to make a good soap. First, select the type of soap. In this activity, the researcher used solid soap. Then determine the unit of weight. Here, we use Gram. After that, determine the water content, which is as much as 38%. Next is superfast oil (oil left in soap that remains in the form of oil/not converted into soap to moisturize the skin) in the amount of 0. Fragrance in making this soap is optional. Usually, the recommendation for using perfume in soap making is 3%. If you do not use perfume, you have to change the 3% level to 0 on the calculator. The next section is about the oil that will be used in making soap. There are various types of oil that can be used in making soap. On this occasion, the soap-making used 900gr of palm oil, 900gr of coconut oil, and 1200gr of olive oil. After filling in the ingredients on the soap calculator, at the end of the calculation, there will be a formula or the number of ingredients that must be added or mixed to make soap. From this recipe, we can see how much clean power the soap has, soap foam, soap’s moisturizing power, soap hardness, shelf life, whether or not the soap is stable, as well as recommendation values that will really help in making this eco-enzyme soap.

Wear personal protection, such as rubber gloves, masks, and industrial glasses, to protect the skin from exposure to harmful materials.

1. Measure the ingredients for making soap using soapee.com.
2. Add 130gr of water into a heat-resistant mixed glass. It is recommended to use distilled water.
3. Add KOH 72gr into the water. In this process, KOH must be added to the water, not water added to KOH. Water mixed with KOH will produce heat and steam, and the steam will endanger breathing. Therefore, the maker needs to use a mask to avoid the mixture of KOH vapor and distilled water. Stir the KOH and distilled water and let the solution stand until slightly clear.
4. Pour the oil into the mixing glass.
5. Add the KOH solution into the oil and stir it using a hand blender for a few minutes until the consistency or tris of the solution becomes gel-like or juice-like.
6. When the solution’s consistency or tris is still liquid, add additives (eco-enzyme). Pour the eco-enzyme slowly while stirring until it is evenly mixed with the solution.
7. Stir the solution until it thickens slightly. At this consistency, add additional coloring if desired.
8. Close the container tightly with plastic. Wait for 1-3 days until the soap color becomes transparent. When the color becomes clear, the soap can be used or diluted.
9. To dilute liquid soap, must use distilled water, not ordinary water.
10. Based on the recipe above, the results of calculating the content of the liquid soap are shown in the following table:

<table>
<thead>
<tr>
<th>Property</th>
<th>%</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bubbly</td>
<td>20</td>
<td>14 - 46</td>
</tr>
<tr>
<td>Cleansing</td>
<td>20</td>
<td>12 - 22</td>
</tr>
<tr>
<td>Condition</td>
<td>51</td>
<td>44 - 69</td>
</tr>
<tr>
<td>Hardness</td>
<td>46</td>
<td>29 - 54</td>
</tr>
<tr>
<td>Longevity</td>
<td>25</td>
<td>25-50</td>
</tr>
<tr>
<td>Stable</td>
<td>25</td>
<td>16 - 48</td>
</tr>
<tr>
<td>Iodine</td>
<td>53</td>
<td>41-70</td>
</tr>
<tr>
<td>Ins</td>
<td>163</td>
<td>136 - 165</td>
</tr>
</tbody>
</table>

From the results of the calculations, it appears that bubbly, cleansing, condition, hardness, longevity, stability, iodine, ins are within the recommended limits of the soap calculator so that the recipe for making liquid soap meets the general calculation standards of a soap calculator.
4 Conclusion

This community service activity was attended by almost all members of PKK RT 03 RW 14, Serengan, Serengan, Surakarta. The members who attended paid great attention to this activity because it provided new benefits and knowledge for them to develop the use of the eco-enzyme they produce. It is hoped that the results of making liquid soap will be not only useful for daily use of soap but also for family economic development by selling soap made by PKK members so that it will be beneficial not only for PKK groups but also for individual PKK members. In the future, other products can be developed through this community service, such as the development of detergent and shampoo.

References


