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Education of Village Youth in the Use of Used Cooking Oil to Become Environmentally Friendly Candles in Kemiri Village

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ABSTRACT

Used cooking oil is a household waste often thrown away, which can damage the environment and endanger health. This community service activity was carried out in Kemiri Village to educate young people about using used cooking oil to make environmentally friendly aromatherapy candles. The method used was interactive discussion and direct presentation, so that participants not only understood the theory but were also able to spread the candle-making independently. The activity results showed that participants were highly enthusiastic and actively engaged in the discussion. In addition to increasing awareness of the value of waste management, this activity created chances for small businesses based on recycled goods to grow. By using household waste, this education is expected to inspire the village youth to be more environmentally conscious and creative. According to this abstract, the SDGs' contribution is as follows:

Contribution to Sustainable Development Goals (SDGs):

SDG 12 – Responsible Consumption and Production

SDG 13 – Climate Action

SDG 8 – Decent Work and Economic Growth

SDG 4 – Quality Education

1. INTRODUCTION

1.1. Research Background

Used cooking oil is oil derived from frying leftovers, generally obtained from household cooking activities [1]. Used cooking oil is not only a risk to human health but also hurts the environment [2]. Public awareness, especially among households, in managing waste is very important to overcome environmental problems [3]. Often, used cooking oil is dumped into the environment without proper consideration, causing water and soil pollution. The presence of used cooking oil embedded in the soil can cause pollution in the soil, which ultimately reduces soil fertility and affects the mineral content in clean water [4]

Reprocessing used cooking waste into valuable materials is one solution to reduce environmental pollution. The process of

recycling used cooking oil waste has great potential to produce products such as aromatherapy candles. Ref. [5] said that aromatherapy candles function as sensory and therapeutic tools that can improve mental health and enrich traditional therapy experiences.

Kemiri Village, located in Puspo District, Pasuruan Regency, East Java, is a developing village with significant human resource potential, especially among young people. However, the young generation in Kemiri Village still does not receive comprehensive education on the importance of household waste management, especially in recycling and the use of waste as an alternative economic resource. In response to this problem, community service activities aim to provide education and training to the younger generation in Kemiri Village on processing used cooking oil into environmentally friendly aromatherapy candles. This activity aims to empower village youth to become more creative, innovative, and independent in playing an active role in



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maintaining environmental sustainability through concrete actions in household waste management

2. MATERIALS AND METHODS

This service activity uses a combined approach of interactive discussions and direct demonstrations to educate youth and mothers in Pangloan Hamlet, Kemiri Village, on how to process used cooking oil into environmentally friendly aromatherapy candles. Discussions were held to encourage participant engagement and explore local knowledge, while demonstrations helped participants understand the candle-making process firsthand so they could practice it independently.

The activity began with socialisation, which covered the dangers of repeated use of cooking oil, the impact of used cooking oil on the environment, and steps for making aromatherapy candles. This training took place at the house of Mr Ari in RW 04 Pangloan Hamlet and was attended by local youth and women who were trained directly by the Village Development Team through hands-on practice, which proved effective in improving their skills. This activity is carried out with simple and easy-to-obtain tools and materials and affordable prices, which include:

Tools: Heat-resistant pots and containers, mixing spoon, moulds (Glass Cups, Used Cans, or Silicone Molds), Fabric strainer, Stove or heater

Materials: Used cooking oil, Lilin stearin, Fragrance/Aroma Therapy (Essential Oils, such as: Lavender, Lemon, Eucalyptus), Used Crayons, Candle Wick.

Evaluations are conducted to assess the program's success. The assessment was based on participants' level of engagement in socialisation and their ability to produce candles independently. Overall, this approach is considered successful in building environmental awareness, improving community skills, and encouraging sustainable recycling practices.

3. RESULT AND DISCUSSION

3.1. Education of Village Youth in the Utilization of Used Cooking Oil

The careless dumping of used cooking oil into soil or the surrounding environment can cause environmental pollution [6]. One solution is to recycle used cooking waste into useful products. Various alternative uses include making soap and aromatherapy candles [7]. Aromatherapy candles made from used cooking oil are a symbol of local products driven by innovation. This product is not only environmentally friendly but also economically valuable, as it can be sold as souvenirs, decorations, and health products [8]. In addition, it can also open up local and online marketing opportunities and strengthen the family economy.

The implementation of educational activities on the use of used cooking oil in environmentally friendly candles has a high level of participation among village youth, an essential indicator of the approach's effectiveness. The high participation reflects the success of information delivery, interest in environmental issues, and public openness to household waste-based innovations.

The level of participation by Kemiri Village youth in socialisation activities and in demonstrations on making candles from used cooking oil showed very positive results. Of the 30 invitations distributed, 24 people attended the activity. A total of 20 participants actively participated in the discussion during the socialisation session. A total of 22 people also expressed interest in trying to make candles independently at home. In addition, this is supported by documentation that demonstrates the community's, especially the youth of Pangloan Hamlet's, direct involvement in service activities.



Figure 1. Residents' Enthusiasm for Attending Aromatherapy Candle Training

The results of socialisation and demonstration showed success in terms of participants' understanding of the material and practical skills. All participants understood the candle-making material and followed the practice directly, indicating that the delivery method was well received.

Consistent collection of used cooking oil is also a challenge because public awareness of storing and recycling the waste remains low [9]. However, behind these challenges lie great benefits that can be felt socially, economically, and environmentally. This candle-making innovation is that the existence of used cooking oil can be used and processed in such a way as to reduce the amount of used cooking oil waste in Kemiri Village, besides that the manufacture of this candle can also be an alternative when the power goes out which often occurs in Kemiri Village, Puspo District, Pasuruan Regency [10]

3.2. Process of Making Aromatherapy Candles from Used Cooking Oil

The process of making aromatherapy candles from used cooking oil has several stages that systematically explain the steps to be taken, from filtering the used cooking oil to cooling, so participants can easily understand and practice making candles independently.

The 1st stage is to filter used cooking oil to remove dirt from food residues using a cloth or fine filter



Figure 2. Oil filtration

The 2nd stage is to dissolve Stearin using the double-boiler method, where Stearin is heated with hot water in a pot so it does not burn.



Figure 3. Stearin Dissolution

The 3rd stage is Mixing, where Stearin is diluted and mixed with used cooking oil at about 60% wax and 40% used cooking oil, then stirred evenly until the wax solution is fully mixed.



Figure 4. Mixing of Stearin with Used Cooking Oil solution

The 4th stage is to add 5-10 drops of essential oil when mixing Stearin, so that the candle has a fragrant aroma.



Figure 5. Adding essential oils when mixing Stearin

The 5th stage is installing the wick on the candle, placing it in the middle of the mould. Then use a skewer or ice cream stick to hold the wick in place so it stays upright; this is shown in Figure 6.



Figure 6. Aroma Therapy Candle Wick Installation

The last stage is the pouring and cooling stage where this stage can be seen in the picture below you can see a youth in Pangloan Hamlet pouring a wax mixture into the mold slowly, then letting it sit until the wax hardens ($\pm 3-5$ hours). After hardening, a fireplace can be done on the wick and the candle is ready to use.



Figure 7. Pouring and Cooling of Finished Candles.

Cooling is used to achieve good results with this aromatherapy candle, as shown in Figure 8.



Figure 8. Aroma Therapy Candle Finish

Based on these stages, packaging is also needed to add value to a product, ensuring the candle is formed as desired. Candles can usually be shaped into aromatherapy candles or decorative candles. Aromatherapy candles can be made by adding essential oils with distinctive scents, making them useful as room fresheners or health products. Meanwhile, decorative candles can be made by adding unique colours or motifs, making them suitable for room decoration. Making candles from used cooking oil can also be an **example** of the circular economy, an economic concept that aims to reduce waste and improve the efficiency of resource use. In addition, wax products from used cooking oil can be an environmentally friendly, economically valuable alternative.

The education and training program on using used cooking oil to make aromatherapy candles in Kemiri Village demonstrated positive outcomes across several aspects, including participation, comprehension, and skill application. High participant enthusiasm reflected the success of the interactive approach used. Out of 30 invitations sent, 24 individuals attended, and 20 actively engaged in discussions, demonstrating the effectiveness of the socialisation and demonstration methods in attracting interest, particularly among local youth. Participants showed

strong understanding by successfully performing each step of the candle-making process independently, from oil filtering and stearin melting to the final cooling stage. The resulting candles exhibited good quality in terms of shape, color, and scent, aligning with both eco-friendly and economic value objectives.

Environmentally, the program helped reduce pollution from the improper disposal of used oil. Although challenges in oil collection remain, it has successfully raised community awareness about sustainable household waste management. Economically, the initiative opened new opportunities, as the aromatherapy candles can be developed into micro-business products with potential in local and online markets. This effort also introduced the circular economy concept at the village level, turning waste into value-added products that integrate ecological, social, and entrepreneurial aspects. Overall, the program proved highly effective, enhanced technical skills, fostered environmental awareness, and generated economic potential—positioning it as a sustainable model for economic and ecological empowerment in rural areas, mainly if supported by structured waste collection systems and product marketing efforts.

4. CONCLUSION

The education and training program on the use of used cooking oil in aromatherapy candles in Kemiri Village, especially in Pangloan Hamlet, has succeeded in increasing environmental awareness, technical skills, and the community's entrepreneurial spirit, especially among village youth. The active participation and enthusiasm of the participants indicate the success of the training methods used. In addition, the wax products produced have economic and ecological value, opening up opportunities for household waste-based businesses. In addition to reducing environmental pollution caused by careless disposal of used cooking oil, this activity also strengthens social solidarity and a culture of cooperation. Thus, in the future, this program needs to be developed through continuous support and the implementation of a structured waste collection system, so that Kemiri Village can become an example of an innovative village in sustainable waste management.

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