



Socialization and Training of Aromatic Candle Processing from Used Cooking Oil for Urban Residents

Wiwiek Andajani^{1*}, Nina Lisanty², Kresna Widigdo Margo Utomo³, Nixie Azalia Whintisna⁴, Rizki Jefri Ramadhan⁵ 

^{1,3}University, Kediri City, Indonesia

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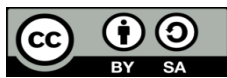
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ABSTRAK

Artikel ini menyoroti inisiatif masyarakat yang bertujuan untuk mempromosikan pengelolaan limbah cair rumah tangga yang berkelanjutan di Kota Kediri, Indonesia. Permasalahan yang teridentifikasi adalah kurangnya perhatian terhadap limbah cair, khususnya minyak jelantah, yang seringkali menimbulkan pencemaran lingkungan dan kerusakan infrastruktur. Kegiatan ditujukan untuk peningkatan sikap sadar masyarakat tentang pembuangan dan daur ulang minyak jelantah yang benar. Pendekatan yang diusulkan melibatkan lokakarya, sesi pelatihan, dan kampanye kesadaran untuk mendidik anggota masyarakat tentang dampak lingkungan dari pembuangan yang tidak tepat dan manfaat daur ulang minyak jelantah menjadi lilin aromatik. Temuan utama mengungkapkan bahwa melalui upaya kolaboratif dengan pejabat lokal dan organisasi masyarakat, inisiatif tersebut berhasil melibatkan anggota masyarakat dan memupuk rasa tanggung jawab terhadap pengelolaan sampah. Program pelatihan memberdayakan peserta dengan keterampilan praktis untuk mengubah minyak jelantah menjadi lilin aromatik, mempromosikan daur ulang limbah sambil menciptakan suasana yang menyenangkan. Kesimpulan menekankan pentingnya partisipasi masyarakat dan kesadaran masyarakat dalam memastikan pengelolaan limbah cair yang berkelanjutan. Inisiatif ini menunjukkan kelayakan daur ulang minyak jelantah dan menyoroti potensi adopsi yang lebih luas dari praktik serupa di wilayah lain. Secara keseluruhan, kegiatan ini menggarisbawahi pentingnya tindakan individu dalam mengatasi tantangan lingkungan secara kolektif dan mendorong penerapan praktik pengelolaan limbah yang bertanggung jawab di tingkat rumah tangga.

ABSTRACT

This article highlights a community initiative aimed at promoting sustainable household liquid waste management in Kediri City, Indonesia. The problem identified was the insufficient attention given to liquid waste, particularly used cooking oil, which often leads to environmental pollution and infrastructure damage. The objective of the activity was to raise awareness among residents about the proper disposal and recycling of used cooking oil. The proposed approach involved conducting workshops, training sessions, and awareness campaigns to educate community members about the environmental impacts of improper disposal and the benefits of recycling used cooking oil into aromatic candles. Major findings revealed that through collaborative efforts with local officials and community organizations, the initiative successfully engaged community members and fostered a sense of responsibility towards waste management. The training programs empowered participants with practical skills to convert used cooking oil into aromatic candles, promoting the repurposing of waste while creating a pleasant atmosphere. The conclusion emphasizes the importance of community participation and public awareness in ensuring sustainable liquid waste management. The initiative showcased the feasibility of recycling used cooking oil and highlighted the potential for broader adoption of similar practices in other regions. Overall, the activity underscored the significance of individual actions in collectively addressing environmental challenges and encouraged the adoption of responsible waste management practices at the household level.

*Corresponding author

E-mail addresses: isantynina@unik-kediri.ac.id (Wiwiek Andajani)

1. INTRODUCTION

In Indonesia, solid waste is generally produced in larger quantities compared to liquid waste by households. Solid waste includes materials such as packaging, food waste, paper, plastics, and other items commonly discarded by households. These wastes can be collected and managed through municipal solid waste management systems, including recycling, composting, and disposal in landfills (Brotosusilo & Handayani, 2020; Salleh et al., 2020). On the other hand, liquid waste refers to wastewater generated from various activities in the household such as bathing, dishes washing, bathing, and cleaning. While liquid waste is also produced by households, it typically constitutes a smaller portion of the overall waste generated. The exact proportions of solid and liquid waste vary depending on several factors, including the region, urbanization level, socioeconomic conditions, and waste management practices (Santoso & Farizal, 2019; Wibisono et al., 2020). Kediri City owns one of the best waste management systems in Indonesia. This city is a medium-sized city that has a waste bank and a community that cares about waste, which has made it a pilot project for waste management in Indonesia. The local government through a designated waste management agency is responsible for collecting waste from households, businesses, and public areas. This typically involves scheduled waste collection services using waste trucks or other suitable vehicles. Recyclable materials collected from households and other sources are sent to recycling facilities for processing. These facilities sort, clean, and process recyclables to be turned into new products or materials. There may also be informal waste pickers who collect recyclables from waste collection points. Food scraps and waste from the garden, are examples of organic waste producing fertile soil via composting process (Lisanty et al., 2021; Lisanty & Junaidi, 2021). Composting facilities or composting programs may be implemented to handle organic waste, either at centralized locations or through community-level composting initiatives. Non-recyclable and non-compostable wastes are typically sent to a landfill for disposal. The landfill should adhere to proper waste management practices to minimize environmental impacts and ensure compliance with waste management regulations (Debrah et al., 2021; Wibisono et al., 2020).

The local government has been conducting public awareness campaigns and educational programs to promote responsible waste management practices among residents (Brotosusilo & Handayani, 2020; Prissando & Ambulanto, 2021; Salleh et al., 2020). These initiatives may include workshops, seminars, and informational campaigns to raise awareness about waste reduction, recycling, and proper waste disposal. According to previous study the residents of Kediri City are aware of the importance of waste management for their environment (Prissando & Ambulanto, 2021). Even though community participation in waste management is relatively good, it cannot be denied that a few individuals continue to discard waste in locations like rivers or gutters. Although solid waste is disturbing, liquid waste is often forgotten. Liquid waste from households is diverse and some are quite dangerous if disposed of directly into rivers or gutters. Throwing liquid waste directly into the sewage system, particularly used cooking oil, can have several negative effects. Cooking oil can solidify and congeal in pipes, leading to blockages and clogging in the sewage system. This can result in backups, overflows, and damage to the plumbing infrastructure. When cooking oil enters water bodies through the sewage system, it forms a layer on the water's surface, preventing oxygen exchange and sunlight penetration. This can harm aquatic life, disrupt ecosystems, and contribute to water pollution (Pascall et al., 2022; Wijaya & Soedjono, 2018). The accumulation of cooking oil in sewage pipes can lead to corrosion and degradation of the infrastructure. Over time, this can result in costly repairs and maintenance for the sewage system. Sewage treatment plants are designed to handle organic waste, but excessive amounts of cooking oil can overload the treatment process. This can lead to inefficiencies, increased treatment costs, and potential disruptions in the treatment facility's operations (Haj Kacem et al., 2018; Prihandrijanti & Firdayati, 2011).

To avoid these issues, it is recommended to dispose of used cooking oil properly. One method is to collect the oil in a container and recycle it at designated recycling facilities or drop-off locations. In some cases, used cooking oil can also be reused or repurposed for other purposes such as biodiesel production or animal feed (Foteinis et al., 2020; Hosseinzadeh-Bandbafha et al., 2022). This activity requires advanced technology and sufficient capital. However, simple prevention can be conducted by each household through the campaign and raising awareness of the people. This idea was proposed by the community service team assigned by the Research and Community Service Center (LP3M) of Kadiri University. The targeted community was the residents of one housing complex in Kediri City, namely Persada Sayang Residential. The activity included education, socialization, and training on how to reuse or process used cooking oil to be another product, such as an aromatic candle. The purpose of this activity

was to raise awareness of the community in managing household liquid waste, especially used cooking oil, by reusing and reprocessing it into aromatic candles.

2. METHOD

The activity was started on the first week of March 2023. The community service team consisted of two lecturers from the Agribusiness Department of Agriculture Faculty and their students. Initially, the team visited the residential officials (Head of Residents' Representative) to ask for permission to conduct the activity. The team engaged with residents to create partnerships and involve them in the initiative. Afterwards, the team conducted awareness campaigns to educate the community about the environmental impact of improper disposal of used cooking oil and the benefits of recycling it into aromatic candles. The activity was done through various channels such as social media, community meetings, workshops, and flyers. On the arranged date, the team organized workshops and demonstrations to teach community members the process of transforming used cooking oil into aromatic candles. It was the second weekend of March 2023. After the routine Sunday morning exercise, more than 30 residents gathered in the common field of the residential area. The team provided step-by-step instructions, practical demonstrations, and hands-on training to enhance their understanding and skills. The training programs were developed to empower interested individuals within the community to become trainers themselves. This enables them to further spread the knowledge and skills related to recycling used cooking oil into aromatic candles.

The team created informative material in the form of pamphlets that explain the process of converting used cooking oil into aromatic candles. This material was readily available to the community during the training, by distributing it to each of them. In this event, the team showcased the process of making aromatic candles from used cooking oil and set up interactive booths where community members could observe and ask questions about the process. Moreover, the team also initiated and appealed to the local officials to set up a designated collection point where community members can drop off their used cooking oil for recycling. The team communicated the purpose and benefits of collecting used cooking oil for candle-making during the collection process. Fortunately, the local officials considered implementing a reward system or providing incentives to encourage community participation in recycling used cooking oil. This can motivate individuals to actively contribute to the initiative and help spread awareness among others.

3. RESULTS AND DISCUSSION

Results

It was a beautiful Sunday morning in Persada Sayang Residential of Kediri City. The team, as previously permitted by the local officials, organized community meetings and workshops to provide information and engage in discussions about environmental issues with the targeted community. This event created a platform for community members to learn, share experiences, and brainstorm solutions. The residents participating were male and female, mostly middle-aged, comprised of 30 people. Among them were the homemakers, who are members of the local waste bank team, who seemed enthusiastic. Prior to this event, the team collaborated with local community organizations (local waste bank team) and local officials.



Figure 1. Brochure or Pamphlet of Step-by-Step Making an Aromatic Candle Using Used Cooking Oil

These partnerships helped leverage existing networks, resources, and expertise to reach a wider audience and conduct joint awareness-raising initiatives. Collaboration also sought the support and involvement of local leaders, influencers, and prominent figures in the community. Their participation and endorsement can amplify the message and increase community engagement. Afterwards, the team launched educational campaigns using several media channels such as social media of WhatsApp groups with the targeted community, relevant videos, and online brochures. Figure 1 below depicts the brochure of a step-by-step guide to making aromatic candles from used cooking oil. This campaign provided easily understandable and visually appealing materials to convey key messages about environmental problems, their impacts, and the importance of collective action. The training programs and workshops were offered on sustainable practices, waste management, energy conservation, or other relevant topics. The team provided hands-on training and practical skills to empower community members to make environmentally conscious choices in their daily lives. The demonstration was arranged to encourage community members to actively participate by asking questions, to sharing their own experiences, and discussing sustainable practices. Brochure or pamphlet of step-by-step making an aromatic candle using used cooking oil is show in [Figure 1](#).

Making an aromatic candle using used cooking oil is a creative way to repurpose waste and create a pleasant ambience. The student members of the community service team were in charge of demonstrating step-by-step guides to the trainees. The first thing to do was to gather the materials. The main materials were used cooking oil and paraffin or used candles. A sufficient amount of used cooking oil should be collected and it is supposed to be properly strained and free of food particles or debris. Other materials included candle wicks, which were typically pre-waxed and come with a metal base; a heat-resistant container to hold the candle, which could be a glass jar, tin can, or any other suitable container; aromatic additives (optional), such as fragrance oils or essential oils of personal choice to create scented candles; and the dye or used crayon for colouring (optional). The team prepared all the materials and equipment on the table so that the trainees could see them clearly, as illustrated in [Figure 2](#).



Figure 2. The Preparation and Introduction of Materials and Equipment

After the preparation, the team continued the demonstration. The chosen container must be ensured clean, dry, and free of any residue because it helps the candle burn evenly. The metal base of the

wick must be placed at the bottom centre of the container. a hot glue gun or a small amount of melted wax can be used to secure it in place. The used cooking oil and paraffin were mixed and placed in the pot on a stove to heat until the mixture was completely melted and liquid. This phase was also the time to add fragrance to the candle. A few drops of fragrance oil or essential oil were added to the melted oil and then stirred well to distribute the scent evenly. The amount of oil added depends on personal preference and the strength of the fragrance. The liquid was then carefully poured into the prepared container with the wick. The container was slowly filled, leaving some space at the top (1-2.5 cm) to allow for the candle to solidify. It may take several hours for the oil to harden and form a solid candle. Once the candle has solidified, the wick can be trimmed to a suitable length (around 0.5 cm) to ensure a clean and even burn. An aromatic candle made from used cooking oil is now ready to be lit and enjoyed. The team suggested the trainees ensure the candle is placed on a surface that can withstand heat, keep it away from anything flammable, and never leave burning candles unattended.

Before closing the workshop and training event, the team distributed candle products that had previously been made by the team in the faculty laboratory to all participants. Next, the team invited the trainees to take a group photo. Unfortunately, most of the participants had dispersed after getting the candles due to rushing for other errands. Picture 3 below is a group photo of the team and some of the trainees. The documentation the community service team and some of the trainees is show in [Figure 3](#).



Figure 3. A Group Photo of The Community Service Team and Some of the Trainees

Discussion

Research on household liquid waste, both globally and in Indonesia, can cover various aspects such as waste composition, management practices, environmental impacts, and policy recommendations. Previous study examine the composition and management practices of household liquid waste in urban areas worldwide ([Azevedo et al., 2021](#)). The study investigates the types of waste generated, disposal methods, and the environmental and health implications. Other study focuses specifically on greywater from domestic activities. It analyzes the greywater characteristics in several countries and explores treatment options for safe and sustainable reuse ([Khanam & Patidar, 2022](#)). More specifically, there is study that investigate household liquid waste management practices in Indonesia ([Harahap et al., 2021](#)). It examines the disposal methods, awareness levels, and challenges faced by households, and provides recommendations for improved waste management. Meanwhile, other study assess the impacts of household liquid waste on water quality in one of the most polluted rivers in Indonesia ([Wardhani et al., 2018](#)). It assesses the existence of pollutants, such as nutrients and pathogens, and their effects on aquatic ecosystems and human health. From the policy framework. There is also study that review the policy frameworks and best practices for household liquid waste management ([Firzah et al., 2022](#)). It analyzes successful approaches and provides recommendations for policymakers in Indonesia to develop effective and sustainable waste management policies.

All of the research above emphasizes the importance of household wastewater management for the environment and the sustainability of living things on Earth. Therefore, the handling of liquid waste must be carried out in every region. Improper disposal of household liquid waste can lead to water pollution, contamination of ecosystems, and harm to aquatic life. Treating and managing liquid waste can help protect water resources and maintain a healthy environment. According to other study untreated liquid waste can contain harmful microorganisms, chemicals, and other contaminants that pose risks to public health ([Hassan Al-Taai, 2021](#)). Proper management and treatment reduce the potential for diseases and health issues caused by exposure to contaminated water sources. Other study state that managing household liquid waste aligns with sustainable development goals, such as responsible consumption and

production (Jacob-John et al., 2021). It promotes the efficient use of resources and reduces the overall environmental impact associated with waste generation and disposal.

As individuals, the best and easiest way to manage household liquid waste, such as used cooking oil, can vary depending on local conditions and infrastructure. Some common approaches may include source separation. Previous study suggest implementing separate systems for collecting different types of liquid waste, such as greywater and blackwater (sewage), which allows for more targeted treatment and reuse options (Besson et al., 2021). Utilizing simple treatment systems, such as septic tanks or biodigesters, can effectively treat liquid waste at the household level (Omani & Acakpovi, 2022; Zaman, 2014). These systems help remove contaminants and reduce the environmental impact before disposal or reuse. Moreover, encouraging individuals to adopt responsible waste management practices through awareness campaigns and educational programs is crucial. People should be educated about the importance of proper liquid waste management, including avoiding the disposal of hazardous substances down drains and utilizing appropriate treatment systems. Governments and local authorities play a vital role in creating and enforcing regulations related to liquid waste management (Debrah et al., 2021; Hassan Al-Taai, 2021). Developing policies that promote responsible waste management practices, incentivize proper treatment and reuse, and provide necessary infrastructure support can facilitate effective management at the individual level. The current community service activity relates to the previous studies mentioned in the discussion in terms of the overall theme of household liquid waste management and the importance of proper disposal and recycling practices (Firzah et al., 2022; Haj Kacem et al., 2018; Omani & Acakpovi, 2022). Like the previous researches, this study recognizes the inadequate attention given to liquid waste management, particularly used cooking oil, which can lead to environmental pollution and infrastructure damage. The objective of this activity aligns with the previous studies in terms of raising awareness among residents about the proper disposal and recycling of used cooking oil. Similar to the previous studies and similar activities, this program emphasizes the significance of community participation and public awareness in achieving sustainable liquid waste management (Kurniawan et al., 2021; Rosdiana Su et al., 2019).

While the previous studies provided broader insights into household liquid waste management in various contexts, this activity focuses on a specific community initiative in Kediri City, Indonesia. This activity introduces a specific approach involving workshops, training sessions, and awareness campaigns to educate community members about the environmental impacts of improper disposal and the benefits of recycling used cooking oil into aromatic candles. The novelty of this activity lies in its emphasis on repurposing waste by converting used cooking oil into aromatic candles, promoting both waste reduction and creating a pleasant atmosphere. By collaborating with local officials and community organizations, the initiative successfully engaged community members and fostered a sense of responsibility towards waste management. The major findings of the study revealed that the training programs empowered participants with practical skills to convert used cooking oil into aromatic candles, thereby promoting waste repurposing and creating a pleasant atmosphere. It showcased the feasibility of recycling used cooking oil and the potential for broader adoption of similar practices in other regions.

4. CONCLUSIONS

While solid waste is generally produced in larger quantities, liquid waste should not be overlooked due to its potential environmental and health impacts. Proper management of liquid waste, such as greywater and used cooking oil, is crucial to protect water resources, maintain a healthy environment, and promote sustainable practices. Individuals can contribute to effective liquid waste management through source separation, on-site treatment systems, reuse and recycling practices, public awareness and education, and policy support. Collaborative efforts between local communities, government agencies, and research institutions can further enhance waste management practices and foster a culture of responsible waste disposal. The education, socialization, and training in processing used cooking oil for urban residents in Kediri City was one sample of proactive steps and adopting sustainable approaches. As individuals, trainees can have a substantial impact on guaranteeing the appropriate management of liquid waste from households, ultimately contributing to a cleaner and healthier environment for all.

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