

Utilization of used cooking oil waste as environmentally friendly aromatherapy candles

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Abstract

Used cooking oil waste is one of the environmental problems often encountered due to the high consumption of cooking oil in the community. Careless disposal of used cooking oil can pollute the soil and water, as well as endanger human health due to its carcinogenic compounds. This activity aims to utilize used cooking oil as a raw material for making environmentally friendly aromatherapy candles while improving the community's skills in processing household waste. The activity was carried out by the Community Service Program (KKN) Group 72 of Aisyiyah University Yogyakarta together with the women of the Family Welfare Movement (PKK) of RW 02 Notoprajan using a hands-on method. The manufacturing process includes filtering used cooking oil, mixing it with stearic acid and coloring, and adding *essential oils* for fragrance. The results show that 90% of participants were able to make aromatherapy candles independently and understood their economic value as marketable household products. Utilizing used cooking oil to make aromatherapy candles has proven to reduce environmental pollution while opening up creative business opportunities for the community.

Keywords: aromatherapy candles; environmentally friendly; used cooking oil; waste

1. Introduction

Waste is an inevitable result of various human activities, both small-scale, such as households, and large-scale, such as industry and agriculture. In general, waste is the residue from human activities or endeavors that is no longer used and has no economic value. In everyday life, almost every human activity produces waste. According to the Big Indonesian Dictionary (KBBI), waste is defined as the residue of a production process or material that has no value or is worthless for its usual or primary purpose in manufacturing or use. In other words, waste is a by-product of production or consumption that is no longer needed and often becomes a burden on the environment. Waste is also often considered worthless and useless, even though if it is not managed properly, its existence can cause serious pollution and disrupt the balance of the environment.

Some characteristics of waste are that it is micro in size, dynamic in nature, has a widespread impact, and has long-term effects. Waste must be treated so that it is not harmful. Organic waste can be decomposed, while inorganic waste can be recycled (Martiyah et al., 2020). Types of waste according to compounds are divided into two, namely organic waste and inorganic waste. The following is an explanation of the types of waste based on their compounds:

1.1. Organic Waste

Organic waste is a type of waste that comes from living things, whether plants or animals (Hasibuan, 2023). Organic waste contains organic compounds and hydrocarbon elements, making this type of waste easily decomposed by microorganisms. Examples of organic waste include vegetables, food scraps, used cooking oil, paper, feces, wood, leaves, and so on.

1.2. Inorganic Waste

Inorganic waste is a type of waste that contains inorganic compounds. Inorganic waste does not contain hydrocarbons, making it difficult for microorganisms to decompose. The solution to inorganic waste is recycling. Examples of inorganic waste include plastic, glass, metal, rubber, iron, and so on.

One example is used cooking oil, which is waste oil that can come from raw materials such as corn, sunflower seeds, olives, and various other plant and animal materials. Several types of oil are commonly used in household needs (Azahra et al., 2024). The high demand for oil as a cooking ingredient, especially in frying, produces unusable leftovers. Used cooking oil is oil that has been used repeatedly, up to a maximum of four times, and has deteriorated in quality. The fat in food should not contain more than 50% free fatty acids.

Waste cooking oil is cooking oil that has been used more than two or three times for frying and is categorized as waste because it can pollute the environment, cause a number of diseases in humans, and contain carcinogenic compounds (Mulyaningsih & Hermawati, 2023). Household activities carried out by the community often produce waste cooking oil that can pollute the environment. This activity is unavoidable because cooking oil is used as an ingredient for cooking, whether for frying or other purposes. The demand for cooking oil is also increasing with the growing number of restaurants, especially fast-food restaurants, that need cooking oil as a raw material for processing the food they sell (Azwin et al., 2024).

The large consumption of cooking oil required by households and industries also has an impact on the repeated use of cooking oil with the aim of reducing production costs or expenses, both from households and from industry (Azwin et al., 2024). This used cooking oil can actually still be reused for cooking purposes, but in terms of its chemical composition, used cooking oil contains carcinogenic compounds that are formed during the repeated frying process, so it poses a risk of triggering cancer if consumed over a long period of time (Chairani et al., 2022). This type of oil can come from various types of oil, such as palm oil, corn oil, olive oil, and others (Muhammad et al., 2020).

Used cooking oil from households is usually disposed of through sink drains that end up in sewers or other waterways, and some is disposed of directly on the ground. Disposing of used cooking oil on the ground can reduce soil quality and fertility, while disposing of it in waterways can cause blockages due to the fat from the oil clumping together and obstructing the flow of water (Chairani et al., 2022). In addition, if not managed properly, used cooking oil can also contaminate groundwater and disrupt the natural ecosystem (Alawia & Farida, 2025).

The continuous disposal of used cooking oil can have a negative impact on the environment and human survival. If used cooking oil seeps into the soil, soil fertility will decrease due to contamination. In addition, this waste can also affect the quality of clean water by changing its mineral content. However, due to the lack of public knowledge about the dangers of used cooking oil, many people still dispose of it carelessly.

Used cooking oil is cooking oil that has been used in the frying process and has the potential to be hazardous if used repeatedly or disposed of carelessly. The excessive use of cooking oil in Indonesia has resulted in a high amount of used cooking oil waste, which, if not properly processed, can have a negative impact on health and the environment. Consumption of degraded used cooking oil can increase the risk of diseases such as cancer, hypertension, and cardiovascular disorders. In addition, direct disposal of used cooking oil into the environment can cause soil and water pollution.

The use of used cooking oil as a raw material for aromatherapy candles offers a double solution, namely reducing hazardous used cooking oil waste while opening up small business opportunities for the community, especially on a household scale. The candle-making process involves filtering used cooking oil, melting it with paraffin, mixing it with fragrances or perfumes, and attractive molding and packaging. Aromatherapy candles made from used cooking oil are physically and aromatically not much different from commercial aromatherapy candles, thus having good market potential.

2. Method

The activity of processing used cooking oil into aromatherapy candles by the KKN 72 Group of 'Aisyiyah University Yogyakarta was carried out on August 11, 2025, at the house of RT 11, RW 2, Notoprajan Village, Ngampilan District, Yogyakarta City. There were 12 participants in the activity,

consisting of women from the PKK RW 2 Notoprajan, aged between 28 and 55 years old. This experimental activity was aimed at increasing the participants' understanding of the stages of candle making while providing them with direct practical experience in producing aromatherapy candles. The main ingredient used was used cooking oil, which was utilized as a form of processing household waste into a basic component in the manufacture of aromatherapy candles.

The stages of the activity began with the preparation of tools and materials used for making candles, then continued with the practice of making aromatherapy candles. The tools used in the practice of making candles include pots, iron stirrer, glass spoons, strainers, knives, and gas stoves. The materials needed are used cooking oil, charcoal as a dirt absorber, stearic acid, essential oil as an aromaticist, crayons as a dye, and wax wicks. Stearic acid is used as a hardener for used cooking oil into wax (Busalim, 2023). The used cooking oil used comes from the cooking oil waste of local residents' households.

Before the activity begins, the used cooking oil is first soaked with charcoal for 24 hours to make it clearer and odorless, then filtered so that it is ready to be used as the main ingredient for making aromatherapy candles (Irda Auliya Hadi Lubis et al., 2024). The process of making aromatherapy candles is done by filtering ± 900 mL of used cooking oil, then heating it over low heat. After that, 450 grams of stearic acid is added until it dissolves completely, then crayons are mixed in as coloring. Next, essential oil is added to taste to give it aroma, then stirred again until evenly mixed. The candle mixture is poured into glass containers that have been fitted with wicks and left to harden for 1-2 hours.

The final stage is evaluation and closing. Evaluation is conducted through discussions and question and answer sessions to determine the extent of participants' understanding. As a form of sustainability, the team also provides education on the potential economic value of aromatherapy candles. With this method, participants not only acquire technical skills in product manufacturing, but also knowledge about the opportunities for utilizing waste cooking oil into products that are marketable and environmentally friendly. The results of the activity showed high enthusiasm, with 90% of participants able to understand the material and successfully make aromatherapy candles independently. The activity of utilizing used cooking oil to make aromatherapy candles is expected to increase public knowledge about the importance of maintaining cleanliness and raising environmental awareness, especially regarding the health hazards that arise from repeated use of cooking oil. The activity was closed with documentation together with the participants.

3. Results and Discussion

The activity of processing used cooking oil into aromatherapy candles, carried out by the KKN 72 Group of 'Aisyiyah University Yogyakarta in RW 2 Notoprajan, went well and received active participation from 12 PKK mothers. The entire series of activities was carried out in the form of hands-on practice, starting from filtering used cooking oil, mixing ingredients, to molding aromatherapy candles. This method proved effective as participants could learn the production process firsthand without prior socialization or theoretical explanation. During the practical stage, participants were invited to directly make aromatherapy candles from used cooking oil that had been soaked in charcoal for 24 hours to make it clearer. The manufacturing process included heating the oil, mixing it with stearic acid as a hardener, adding crayons as coloring, and adding essential oils as fragrance. The candle mixture is then poured into molds with wicks and left to harden for 2-3 hours. The results of the practice show that participants were able to carry out the steps well, with some even showing creativity in choosing colors and scents according to their preferences.

The results of the activity showed that most participants were able to follow the candle-making steps well. A total of 90% of participants successfully produced aromatherapy candles independently after being guided throughout the process. The participants' enthusiasm was evident from their involvement in each stage, as well as the questions they asked about the variety of ingredients, scents, and potential uses of the products. Through this activity, participants not only gained technical skills but also an understanding of the importance of processing household waste so that it has practical and economic value.

High enthusiasm was evident from the participation of the women who took turns trying each stage of candle making. This shows their motivation and interest in utilizing used cooking oil into more useful and economically valuable products. In addition, participants also realized that aromatherapy candles

not only function as room fresheners and stress relievers, but can also be developed as marketable household products that have the potential to increase family income.

The practice of making aromatherapy candles from used cooking oil has proven to be an environmentally friendly alternative solution while also opening up simple business opportunities for the community. This activity was able to improve the participants' understanding and skills effectively, quickly, and practically. Overall, the results of the activity showed that the community can gain knowledge and skills in processing household waste into useful products. The positive response from participants confirms that this program is relevant, easy to implement, and has the potential to be a creative solution in reducing environmental pollution caused by the use of used cooking oil.

4. Conclusion

Used cooking oil waste generated from household activities and the food processing industry is a source of environmental pollution that requires special attention. Careless disposal of used cooking oil can damage soil and water quality and endanger human health due to the carcinogenic compounds formed during repeated frying. The lack of public knowledge about the negative impacts of used cooking oil often results in this waste not being managed properly. Through community service activities carried out by the KKN 72 Group of 'Aisyiyah University Yogyakarta, it was discovered that used cooking oil can be reused to make environmentally friendly and economically valuable aromatherapy candles. The activity, which was carried out using a hands-on approach, proved to be effective in improving the understanding and skills of the participants, especially the PKK mothers in the RW 2 Notoprajan area. The participants not only understood the dangers of used cooking oil waste, but were also able to process it into products that have commercial value. A total of 90% of the participants successfully made aromatherapy candles independently with satisfactory results, showing that practice-based education methods are more easily accepted and understood by the community. These results show that education on the utilization of household waste can promote environmental awareness while opening up opportunities for creative businesses at the household level. Thus, the utilization of used cooking oil into aromatherapy candles is an innovative and applicable solution in reducing the impact of pollution and improving the welfare of the community in a sustainable manner.

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