Handwash Soap Production by Recycling Used Cooking Oil to Empower a Boarding School in Surakarta

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ABSTRACT

Cooking oil is a primary good used for daily cooking purposes. In Indonesia, normally cooking oil is used up to four times frying. The used oil locally is referred to jelantah oil, blackish-brown colored, contains very high levels of cholesterol, and carcinogen, and it may cause harm for human health. Jelantah oil usually will be directly disposed of the environment, this may cause water and soil pollution. According to this, it is necessary to educate people to do reduction and recycle the used oil (jelantah), as will be done in Kanzus Sholawat Surakarta Foundation located in Sukoharjo, Central Java. The jelantah oil will be processed into handwash soap products with a feasible, easy, and cheap method and utilizing easily obtained material. To start, a 500 ml of used cooking oil is filtered and mixed with 160 grams of NaOH flakes soluted in 200 ml of water. Some drops of fragrance are added to make the soap perfumed. The purpose of this community service is to assist the Kanzus Sholawat Surakarta Foundation to take the economic value from the oil waste. The program will be carried out by training and guidance to process the jelantah oil into handwash soap, and continuous evaluation to make sure the Kanzus Sholawat Surakarta students and the nearby community get the optimal benefits. It is also expected that this activity can support the foundation’s vision to become an environmentally minded institution.

Keywords: Used cooking oil, soap, community service, Surakarta

Introduction

Rapid population growth accompanied by the spread of community settlements will have an effect on waste disposal from household activities. More activities may increase the generation of waste in the environment. One of the household activities that always exist in the community is cooking. A common ingredient used for cooking is cooking oil.

Cooking oil is commonly a vegetable-based oil that has a limited shelf life. After repeated use, cooking oil will become used cooking oil or used cooking oil. Cooking oil cannot be used multiple times, and need to be disposed of after several times of use. If the used cooking oil is still used for cooking activities, it can hurt health (Wijaya et al., 2014). Multiple-use of used cooking oil may cause carcinogenic free radicals such as peroxides, epoxides, and others. Consumption of foods containing peroxide can cause colon cancer (Rahayu, et al., 2020).

The used cooking oil produced by households is disposed of with domestic waste or disposed of through sewers. This can also cause problems, like clogging the sewer systems. Used cooking oil at low temperatures will freeze so that if it is discharged through the drain pipe it will cause blockages and disrupt the flow of wastewater (Wijaya et al., 2014). Used cooking oil can also...
pollute water and soil. The oil that is also wasted in the river will prevent the entry of air into the water, because the oil is in the upper layer of the water, and this can interfere with the survival of organisms in the river. Used cooking oil that is dumped into the ground can reduce soil fertility (Matusinec et al., 2020).

The handling of used cooking oil can be done independently by the community. Used cooking oil can be used to make soap. This is because used cooking oil contains hydroxide (Na or K) from natural fatty acids derived from vegetable or animal fats. This soap-making process is based on a saponification reaction with the addition of alkali hydroxide (i.e. sodium or potassium hydroxide). To remove harmful substances and smell bad, used cooking oil must first be treated with a filtration method (Tsai, 2019).

Kanzus Sholawat Surakarta Foundation is located in Gentan Village, Baki Village, Sukoharjo, Central Java. This foundation is located in the middle of a residential area, with various routine activities every day. This foundation was only established in early 2021 and has the vision to develop an environment-based pesantren education curriculum. The foundation is inhabited by several female students and is also a center for spiritual activities for residents regularly.

With a variety of existing activities, the Kanzus Sholawat Surakarta Foundation produces several types of waste which are routinely produced every day. The waste includes cooking oil from cooking activities, plastic waste from packaging, food wrapping cardboard, paper waste, and various other types of waste. For now, waste management still relies on local waste managers who pick up trash regularly, and use makeshift sewers in the surrounding ditches.

Waste cooking oil is quite a lot generated from daily activities in Kanzus Sholawat Surakarta. Currently, waste cooking oil is discharged directly into the public canal behind the building without going through any processing. This has the potential to increase the burden of environmental pollution in the surrounding canal, as well as waste the economic potential of the used cooking oil.

Material and Methods

Making soap from used cooking oil requires several stages, starting from cleaning used cooking oil, preparing ingredients, and making soap. The following is the method of making soap from used cooking oil (Chandra et al, 2020):

A. Waste Cleaning
1. Put cold charcoal or hot charcoal (after being made into coals) into cooking and let stand for 1-2 days. The size of the charcoal is made small so that the surface that is in contact with the oil is more.
2. Filtering used cooking oil with a cloth/sieve.
3. Waste cooking is ready to be processed into soap.

B. Material Preparation
1. Prepare clean, filtered cooking as much as 0.5 liters or 450 grams
2. Prepare 80 grams of NaOH
3. Prepare 170 grams of water for coffee or lemongrass/pandan blended water. Next, strain the coffee/pandan/lemongrass blended water. Coffee/pandan/citronella water is used to disguise the smell of cooking oil.

C. Soap Making
1. Dissolve the NaOH little by little into the coffee/pandan/lemongrass water by stirring slowly until it runs out.
2. The NaOH reaction is an exothermic reaction that gives off heat.
3. After the NaOH dissolves let stand and waits until it becomes room temperature.
4. After the NaOH solution and cold coffee/pandan/lemongrass water enter the used cooking oil little by little with stirring. After all the used cooking oil is poured, keep stirring for 15-20 minutes until traces. Trace is indicated by thick traces when the stirrer is lifted.
5. Put the solution into the mold or pan.
7. Remove the hardened soap from the mold.
8. Store in an open container, leave in a protected open space for 3-4 weeks (Curing Process).
9. Soap is ready to be packaged and used for washing dishes, rags, cleaning the bathroom, and so on (not for bathing).

Results and Externals Achieved

In the preparation stage, a survey of the location of the Islamic boarding school of the Kanzus Sholawat Foundation in Surakarta was carried out and coordination was carried out with the chairman of the foundation regarding the program to be implemented. At this stage, observations were also made of the daily activities of Kanzus Sholawat students, especially those related to cooking. Kanzus Sholawat is inhabited by around 40 students who produce quite a lot of used cooking oil every day. This cooking oil was initially only disposed of directly through the dishwasher which was directly connected to the public sewer at the back of the building.

After the survey was conducted, the scheduling of the training activities was communicated with the head of the foundation and Kanzus Sholawat students. At that time, it was also socialized to collect used cooking oil from cooking activities and stop dumping it directly into public sewers.

The training activity for processing used cooking oil into soap was carried out in the morning of July 30, 2021, online and offline by complying with health protocols during the pandemic. The lecturers, students, and residents listened to the explanation given by the UPN "Veteran" Jawa Timur community service team regarding the benefits of processing used cooking oil, especially in terms of the environment and the economic benefits that can be obtained from processing waste that is usually disposed of.

After the opening activities and the delivery of the material, it was followed by training in making soap from used cooking oil. The students participated in trying to make soap from used cooking oil according to the method described in the previous chapter. In this training, it was determined the composition of 500 ml of used cooking oil, 160 grams of caustic soda, 200 ml of water, and a few drops of deodorizer until you can smell the fragrance when stirring. This dose is enough to fill 3 soap molds, each mold consisting of 8 slots.

Figure 1. Socialization and training on the use of used jelantah oil
After the demonstration by the community service team, students and female students were invited to try the process of making soap from used cooking oil for themselves. Questions and answers were conducted to increase students’ understanding of the processing of used cooking oil.

The soap that is made requires a curing or hardening period of one week to stabilize the caustic soda so that it is not harmful to the skin, and so that the soap mixture hardens completely. The resulting soap product has a green tea aroma, produces quite a lot of foam, and removes oil from the skin when used for washing hands.

Collaboration between the academic community, namely students, lecturers, and santriwati Kanzus Sholawat, provides a good reciprocal relationship, as well as increases the knowledge of environmental love for students. There needs to be a follow-up to further maximize the utilization of other wastes so that they can help with the problems that exist in partners.

Conclusion and Suggestions

The training in the process used cooking oil in soap has been a good start for the Kanzus Sholawat Foundation is pioneering its journey to becoming an environmentally friendly Islamic boarding school. This program opens the insight of students into minimizing waste production, especially used cooking oil, and gives an idea of the potential for recycling wastes produced from daily activities. It is expected that the good relationship between UPN "Veteran" Jawa Timur will be maintained sustainably, and can continue to share knowledge.

References


