

## Training On The Making Of Solid Soap By Utilizing Used Cooking Oil Waste By Pkk Women In Wangen Village

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### Abstract

Social welfare can be improved in various ways that can be done, for example, through community empowerment programs. The part of the community that can be empowered are housewives who are members of the PKK organization, especially in Wangen Village, Polanharjo District, Klaten Regency. The impact of environmental pollution is due to the disposal of used cooking oil and is followed by an increase in the use of cooking oil due to the appeal to stay at home during the Covid-19 pandemic. The existence of this makes a training program and assistance for the utilization of cooking oil waste into soap is the right thing to deal with this problem. The specific goals and targets to be achieved in this activity are that PKK mothers are interested and motivated to become entrepreneurs, to form groups of PKK members who become economically independent by producing soap. In order to achieve this goal, a community service program was carried out by a lecturer at the University of Duta Bangsa Surakarta who provided soap production training conducted by PKK women in Wangen Village. The result of this service is an increase in the skills of PKK Village women in Wangen in making soap from used cooking oil waste.

**Keywords:** Oil, Soap, Training, Production

### I. Introduction

The term cooking oil waste called used cooking oil may often sound and become a very familiar term. The oil is actually obtained from the frying process. The Central Statistics Agency (BPS) states that the consumption made by Indonesians has increased from year to year. The existence of this phenomenon makes more used cooking oil waste generated from it. However, the presence of used cooking oil from public consumption has a particularly negative impact on the environment. The resulting impact will eventually enlarge and cause potential pollution of domestic waste water as well. This also cannot be separated because the utilization of the waste has not been maximized. Decree of the State Minister for the Environment Number 112 of 2003 states that the standard quality of domestic wastewater is waste that comes from several sources, namely businesses and residential activities, restaurants, offices, apartments and even dormitories. The impact that is felt most by housewives and the community, especially the impact of disposal of oil waste water can freeze in the sewer, thus obstructing the flow. Another big problem

faced if the cooking oil waste is disposed of carelessly into the environment can cause pollution to the environment<sup>1</sup>.

Cooking oil or what is known as waste cooking oil, when disposed of into the water, will damage the ecosystem. This is due to the presence of COD (Chemical oxygen Demand) and BOD (Biological Oxygen Demind). Both will result in the surface of the water being covered with a layer of oil so that sunlight cannot enter the water. This also has an impact on the death of aquatic biota which will ultimately disturb the aquatic ecosystem <sup>2</sup>.

Used cooking oil can be processed into bath soap either in solid or liquid form <sup>3 4</sup>. Utilization of soap Soap is produced from the hydrolysis of oil or fat into free fatty acids and glycerol which is followed by a saponification process using a base (KOH or NaOH). Free fatty acids that bind to bases are called soap.

Soap is often used by most of the community to wash dishes, clothes, furniture and others made from a mixture of alkalis (sodium or potassium hydroside), and triglycerides from the C16 carbon chain fatty acids. Reactions that occur during the soap-making process range from 80-100°C <sup>5</sup>. This process will hydrolyze fatty acids by alkalis to form glycerin and raw soap. Soap is intended to remove dirt and grease because the chemical structure of soap consists of hydrophilic parts in the ion chain and hydrophobic in the carbon chain<sup>6</sup>.

Soap-making can be done in several ways, one of which is the saponification process and the oil neutralization process. The saponification process in oil obtained a byproduct of glycerol but the neutralization process did not get the product<sup>7</sup>. The reaction process

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<sup>1</sup> Ginting, D. Wirman, SP. Fitri, Y.Fitrya, N. Retnawaty, SF. Febriani, N. 2020. PKM Pembuatan Sabun Batang Dari Limbah Minyak Jelantah Bagi IRT Kelurahan Muara Fajar Kota Pekanbaru. Jurnal Pengabdian Untuk Mu NegeRI. 4 (1). 74-77.

<sup>2</sup> Abduh, N. (2018) Ilmu dan Rekayasa Lingkungan. Makasar: CV Sah Media.

<sup>3</sup> Wijana, S., Pranowo, D. & Taslimah, M.Y. 2010. Penggandaan Skala Produksi Sabun Cair dari Daur Ulang Minyak Goreng Bekas. J. TeknoL. Pertanian. 11(2):114-122

<sup>4</sup> Priani, S.E. & Lukmayani, Y., 2010. Pembuatan Sabun Transparan Berbahan Dasar Minyak Jelantah serta Hasil Uji Iritasinya pada Kelinci. Prosiding SnaPP, Edisi Eksakta. ISSN: 2089- 3582.

<sup>5</sup> Jongko. 2009. Sabun Kecantikan: Teori dan Praktek Membuat Sabun Beauty di Rumah. Jakarta : Duraposita Chemistry

<sup>6</sup> Supriyadi, E. Dewanti, RN. Sofyan, S. Junaedi. Kurniasih, N. 2020. Penyuluhan Dan Dan Pelatihan Pembuatan Sabun Cuci Piring Di Perumahan Griya Serpong Asri Cisauk Kota Tangerang Selatan. Abdi Laksana Jurnal Pengabdian Kepada Masyarakat. 1 (3). 319-324.

<sup>7</sup> Spitz, L. 1996. Soap and Detergent, A Theoretical and Practical Review. Illinois: AOCs Press

between triglycerides and alkalis, but the naturalization process occurs because of the reaction from the origin of free fat with alkali called the saponification process. This process is necessary to produce soap that is used in everyday life, such as cleaning kitchen utensils from grease and dirt. The daily consumption of soap usage has increased which has led to an increase in the demand for soap. However, buying soap costs money, where during the Covid-19 pandemic the need to live is higher.

In general, soap is known in two forms, namely solid soap and liquid soap. The difference between the two types of soap is the alkaline reaction used when making soap. Solid soap uses NaOH while liquid soap uses KOH as the lye. Over time, solid soap is divided into several types such as opaque, translucent and transparent soaps<sup>8</sup>. The type of bath soap that is generally used by the community for daily life in a solid and non-transparent form is called opaque soap. The difference between translucent soap and transparent soap lies in their appearance. The appearance of translucent soap is bright but translucent and not clear, but the appearance of transparent soap is shinier and clearer so that it can be seen on the front side when viewed from the back side.

Science which from time to time develops along with technology makes the development of cosmetics return to the direction of natural products with the back to nature campaign<sup>9</sup>. There needs to be a development in adding natural ingredients for health to the sabuncair used. This will provide positive added value to the product to be used. The added value of the product will give a positive impression from consumers such as softness and smoothness after use with the soap so it doesn't irritate the skin and so on<sup>10</sup>. One of the natural ingredients added in the manufacture of liquid soap is fat or oil obtained from vegetable and animal ingredients<sup>11</sup>.

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<sup>8</sup> Hambali, E., Tatit K. B., Ani S., Giri A. K. 2005. Aplikasi Dietanolamida dari Asam Laurat Minyak Inti Sawit pada Pembuatan Sabun Transparan. Jurnal Teknologi Industri Pertanian. Vol 15

<sup>9</sup> Duraisamy, A., V. Krishnan, dan K. P. Balakrishnan. (2011). Bioprospecting and New Cosmetic Product Development: A Brief Review on The Current Status. International Journal of Natural Product Research, 1(3): 26-37.

<sup>10</sup> Zulkifli, M. & Estiasih. 2014. Sabun dari Distilat Asam Lemak Minyak Sawit. Jurnal Pangan dan Agroindustri. 2 (4):170-177.

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Wangen Village is one of the villages in the Polanharjo sub-district, Klaten district, Central Java. This village has 18 RT and 6 RW divided into several hamlets, has a total population of nearly 2,974 people (male 1,481 people and 1,493 women) divided into 950 families (male 788 family heads and 162 female families). Wangen Village is a fairly large area, with a high population density. The geographic location of Wangen Village, Polanharjo District, Klaten Regency is located between the north of Janti Village, Polanharjo District, the South of Karanglo Village, Polanharjo District, the West of Daleman Village, Tulung District and the East of Keprabon Village and Kebonharjo Village, Polanharjo District, the use of cooking oil in the village is quite sufficient. big.

The existence of the Covid-19 pandemic that has not ended has resulted in a policy from the government to stay at home and keep social distancing. This makes people do more of their activities at home. Of course, these activities such as daily work, school and cooking activities. Cooking activities, which are actually for working families, usually only have a frequency of once to three times a day. The impact of this is of course the use of cooking oil will also increase. This will also affect its disposal which will end up in the surrounding environment which will have a negative effect in the form of environmental pollution. This also happened in Wangen Village, Polanharjo District, Klaten.

The housewife is a figure who is directly involved in providing household food. That way the housewife is also the most dominant in its use of used cooking oil. This makes it important for housewives to have knowledge and insight about the impact of used cooking oil waste on health and the environment. One of the education that will be given at this service is education on the use of used cooking oil repeatedly which will cause dangers and the disposal of oil will also have a negative impact on the environment. This impact will also be felt strongly because the service location is near a river, which is a source of water.

Housewives usually join organizations such as the PKK. Empowerment of PKK mothers as members of the community and still classified as productive labor is very important to do, in relation to efforts to foster and develop family and regional potential, can be done through various alternative activities, including training in soap making. This alternative was chosen considering that PKK cadres in this area really need knowledge and skills that can be used as provisions for pioneering business opportunities. Based on the explanation above, this service program will disseminate the dangers of waste cooking

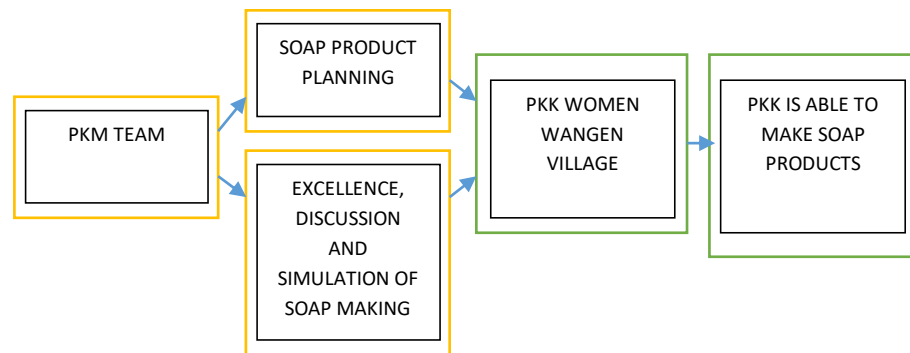
oil to the environment and utilize used cooking oil waste as raw material for making soap.

## II. Method

The methods for implementing the activities are as follows:

1. Activity: Making new breakthroughs related to the use of waste oil into soap.
2. Activity Content: Socializing the utilization of waste oil and making soap from oil.
3. Place: Wangen Village, Polanharjo District, Klaten Regency.
4. Tools: Tools used such as molds, stirrers, plastic containers and scales.
5. Ingredients: cooking oil, water, charcoal, fragrance oil and lye.

For the flow of community service as follows:



Gambar 1. Service Stages Flow Chart

The service activities carried out to overcome the problems that exist in Wangen Village, especially regarding the increasing use of oil which has an impact on environmental pollution and the health of the surrounding community, can be described at several points that will be carried out:

### 1. Preparation phase

The preparation stage is the first stage carried out such as coordination with the RT head together with PKK mothers in Wangen Village, Polanharjo District, Klaten Regency.

### 2. Socialization Stage

After the preparation stage is carried out, the community service team will first conduct the socialization. The socialization in question is about the date of the service and the importance of carrying out the program. This stage is also intended to gather information about the condition of the community, then the next stage is to prepare a presentation

material slide that contains the impact of waste cooking oil disposal and how to make soap from used cooking oil.

### 3. Outreach Training Materials

The materials that had been prepared were then given to PKK mothers about soap making training. The purpose of holding this counseling is to share knowledge and insights with PKK women about the utilization of oil waste and to show that there is a wide open opportunity behind this impact. It is hoped that the opening of the inner mindset of PKK mothers will motivate themselves to become entrepreneurs. Besides that, material on the basic principles of manufacture was also given, aiming for partners to know how to manufacture. This counseling is delivered in the form of lectures and questions and answers to participants.

### 4. Soap Making Training

Training is the core stage of community service. PKK mothers are trained to make soap and this training aims to improve the skills of PKK mothers in making soap. The training was conducted in the form of lectures and was continued with hands-on practice carried out by PKK mothers. Besides the training, there is also time for question and answer and discussion. The training was held until all participants were proficient at practicing on their own.

### 5. Evaluation Phase

The evaluation stage is the final stage carried out in the service program. This evaluation contains activities to conclude and assess the suitability of activities with the training provided. The favorite response to this service program can be done by assessing the PKK mothers of the community service programs given, of course, the assessment is in the form of a scale. If the total criterion score is obtained by multiplying the scale value times the number of samples / respondents <sup>1213</sup>. The criterion score is obtained from the multiplication of the respondent's answer multiplied by the number of the respondent's grade.

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<sup>12</sup> W. A. Saputro, F. Edi, N. Saputro, "Program Agroschooling pada Siswa Sekolah Dasar SD 01 Manang untuk Meningkatkan Minat terhadap Bidang Pertanian," vol. 2, no. 1, pp. 68–79, 2020.

<sup>13</sup> Nanning. Abbas, Ahmad. Ibrahim, Abd Rauf. Mujahidah. 2020. Increasing The Economy Of Village Community Through Banana Waste Management. Journal of Community Services and Research. 4 (1).

### III. Main Heading of the Analysis or Results

The service step taken is coordination in advance with coordination with the Wangen village, especially PKK mothers as partnerships with lecturers and students of Duta Bangsa University Surakarta. This stage discusses when the service will be carried out along with the place and time of implementation. The discussion also discusses the implementation of outreach and training. This counseling on community service discusses the material regarding formulas that must be prepared when making handmade soap. The training material contains materials, tools and methods of making soap.



Gambar 2. Mentoring Steps

The process of making solid soap from used cooking oil waste does not have a very high level of difficulty, in fact it is very easy to manufacture. The stages in making solid soap from used cooking oil will be shown in the following table along with the required formula.

Table 1. Formula Required In Making Solid Soap

No	Name of Material	Compotition
1	VCO	175 gram
2	Used cooking oil	325 gram
3	NaOH	75 gram
4	Fragrance	15 gram
5	Water	190 gram

Sumber : Nanning dkk, 2020

Table 1 shows the formulas needed for making solid soap. Charcoal is used to neutralize and purify used cooking oil. Before using charcoal, it must be burned first so that the coals become active. Soak used cooking oil in charcoal for 24 hours. Put lye in the water, don't do the reverse because it will be dangerous. Stir the lye into the water. Add used cooking oil added with VCO. Pour the lye and water mixture into the used cooking oil that has been added by VCO which has cooled. It should be mixed after cooking oil is at 30o C. Stir all the ingredients until evenly distributed and pour about two tablespoons of fragnance. Stir again and then pour it into the mold. Let stand two days then remove from mold. Used cooking oil soap can be used after four weeks.

The preliminary treatment stage of raw materials which includes filtration and adsorption and the stage of product manufacture. Filtration: This process aims to separate oil from impurities in the form of solid matter. The method is filtered used cooking oil using filter paper. The result of the filtration is in the form of oil that is free from impurities in the form of solids. Adsorption: This process aims to remove dark oil color, oil odor. The result of this adsorbs process is clear and odorless oil. This is done by heating the oil at 60 ° C plus 2% activated carbon and stirring for 30 minutes. Furthermore, the oil is filtered to separate the oil from activated carbon and adsorbed impurities. The manufacturing stage of the product is 325 ml of used cooking oil that has been purified and heated according to the desired process temperature (30OC) plus 175 grams of VCO and 75 grams of NaOH with a concentration of 35% plus 190 ml water with stirring to trace. After reaching the trce state, the mixture is added to enough food coloring and perfume and stirred slowly so that it is homogeneous and poured into a soap mold. Let the soap sit for 2 weeks so that the lathering process runs perfectly. After 2



weeks the soap is ready to be tested for pH. In theory, increasing the amount of NaOH will increase the free alkali from the soap formed in the soap-making process, especially after the equivalence point has been passed. After the equality point has been passed, increasing the NaOH concentration will increase the soap-free alkali. The effect of NaOH concentration on the free lye of soap was tested at 40 ° C.

This used cooking oil soap can be used for washing clothes, dishes, as a material for mopping floors, but it is not recommended as a bath soap. Not yet known the safety level of used used cooking oil soap, but he tried using Litmus paper which he thought could be a helpful indicator to see its safety. Soap with a pH of 8 means it is safe to use.

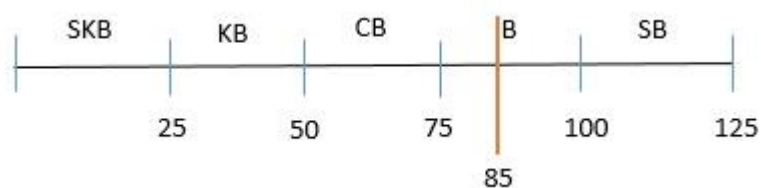


Gambar 3. Handmade Soap Making

Community service activities that have been carried out cannot be separated from several factors, both driving and inhibiting factors. The driving factor for this activity includes good coordination and cooperation between the community service team and those who will be subject to the training program. Good coordination is established starting with students, lecturers, participants, village officials and PKK mothers who are willing to take part in the training until the availability of materials, facilities and infrastructure to support training so that the service program can run smoothly. Participants in community service activities, namely PKK Wangen Village women, can participate in cooperative activities and are very enthusiastic in participating in the programs provided and the time support given in making handmade soap.

The inhibiting factor that exists in community service activities is the relatively short time so that participants must be quick in responding to the material given. The material and technical training given regarding soap making must be followed by providing insight into the knowledge about the impact of discharging used cooking oil into the environment which causes negative effects on pollution and public health. Knowledge for mothers about management and managerial as well as industrial development that can be done with this handmade soap along with simple business feasibility materials so that later this program can continue into a business and marketing unit. However, all the things that have been disclosed must go through good preparation and development research first. These obstacles must be explained beforehand, accompanied by counseling and strengthening the skills of PKK women about handmade soap so that it can provide added value from the waste used cooking oil produced by households in Wangen Village.

Community service activities that are already running, it is hoped that further studies can be carried out. The expected follow-up activities include developing handmade soap into a wider industry by utilizing the local potential of Wangen Village. This will later become a role model for the surrounding area. It is also hoped that further communication will continue between the Duta Bangsa University Surakarta and the PKK women of Wangen Village so that the follow-up program can still be continued.



**Gambar 4.** Rating Scale

Based on Figure 4, it is known that the rating scale for the perceptions of PKK mothers towards the community service program activities given has a score of 82. This figure shows that the community service program given falls into the good category. According to the PKK women of Wangen Village, the program given is able to increase knowledge and insight into the impact of used cooking oil on the environment and health. In addition, the program provided was able to improve the skills of PKK mothers to make handmade soap from used used oil waste. With this good perception, the

perception rating scale shows that this service activity can be used as a good example in community empowerment, especially PKK mothers.

#### IV. Conclusion

The use of used oil waste into soap which has been carried out in this community service program is expected to provide meaningful knowledge and insight for PKK women in Wangen Village, Polanharjo District, Klaten Regency. Increased knowledge of the impact of environmental and health pollution due to the large number of cooking oil waste has also been widely known by PKK women so that later they are expected to be more aware of this. Furthermore, community service can be carried out to develop the use of soap which is not only used but can be a source of income for housewives.

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