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Utilization of Milk Waste and Rosemary as Enviromentally Friendly Soap in Samirono, Getasan, Semarang

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ABSTRACT

Fresh cow's milk has weaknesses, namely it is easily perishable, and its shelf life tends to be short. Processing fresh cow's milk into product is one of the efforts to extend the shelf life of cow's milk. One of the products that can be made from fresh milk is soap. The ingredients used in making soap are quite simple and widely available in the market at relatively cheap prices. Rosemary can be used as an additive in manufacture of cow's milk soap. The target of making an envirometally friendly soap is to target people who have dairy cows. The goal to be achieved is give training to farmer to increase the value of cow's comodity and increase entrepreneurship by producing and marketing enviromentally friendly soap and being able to solve the problem of relatively short milk shelf life. The service implementation was carried out training and demonstration. The this stage, a training process was carried out on making soap from fresh cow's milk waste and marketing methods for the product. It is hoped that milk that is not consumed again can be processed into soap using active ingredients from rosemary, so that the soap produced can increase added value both economically and for the environment. The result of this community service is solid soap using raw materials from milk waste and rosemary. This community service activity was received with great enthusiasm by the participants who took part in the training on how to make cow's milk soap. There is a significant difference ($p < 0.05$) in the results of the pretest and posttest questionnaires, indicating an increase in understanding of the material presented in this community service activity. This activity has been successfully implemented.

1. Introduction

Central Java Province. Based on BPS data, Samirono Village has an area of 3.34 km² consisting of 3 RW and 13 RT with a population of 2,446 people. This village is located around the slopes of Mount Merbabu with an average altitude of 1004 meters above sea level. Samirono Village is a producer of agriculture, vegetables, fruits and livestock. In terms of livestock, it is dominated by dairy cattle and poultry (Badan Pusat Statistik Kabupaten Semarang, 2022).

Fresh milk is obtained from healthy and clean cow udders through correct milking, has natural ingredients, and has been processes (BSN, 2011). Milking dairy cows is carried out twice a day, namely in the morning (around 6 AM) and in the afternoon (around 4 PM). Generally, milk produced by farmers is directly distributed to dairy cow milk reservoirs to be further processed into dairy products. Some farmers also sell fresh cow's milk produced directly to consumers.

Fresh cow's milk has weaknesses, such as being easily perishable and its shelf life tends to be short (Susanti *et al.*, 2018). Fresh cow's milk's relatively short shelf life is a problem for farmers. Processing fresh cow's milk into a product is one of the efforts to extend the shelf life include processing fresh cow's milk into products (Susanti *et al.*, 2018). Processing fresh cow's milk into milk-based processed products will provide added value to these processed products. Efforts to increase the economic value of fresh cow's milk must be carried out, especially when the amount of fresh cow's milk production is abundant, but the quality does not meet the criteria, while the shelf life of fresh cow's milk tends to be short. This will have a positive impact on the residents of Samirono Village as a solution to the surplus of milk production considering its short shelf life and at the same time improving the living standard of the surrounding community. Processing milk into processed products such as soap is one of the efforts to increase the selling value of milk (Ramdan *et al.*, 2019). Processing milk into soap can increase the selling price up to 4 times the selling of fresh milk (Mukson *et al.*, 2009).

The ingredients used in making soap are quite simple and widely available in the market at relatively cheap prices. The process of making soap is also very simple, the equipment used is easy to find and can be applied in small-scale production. In addition, to get soap with certain benefits, additional ingredients (such as scrubs, peels, aromatics and others) can be added during the manufacturing process. The soap products that are developing today are very diverse and have more benefits. One of the additional ingredients that can be used in making soap is rosemary. Rosemary is one of the plants that is included in aromatic plants that can be used as an additive to soap. Rosemary contains essential oils that can be used to reduce excess oil production on the face, reduce signs of agings, overcome acne problems, and stimulate hair and skin growth (Sofiah *et al.*, 2019). Rosemary can also be used as a scrub in soaps.

The target of making environmentally friendly soap is directed at people who have dairy cows. The goal to be achieved is to increase the value of cow's milk commodity and increase entrepreneurship by producing and marketing environmentally friendly soap. In addition, it can solve the problem of relatively short shelf life of cow's milk.

2. Methods

The service implementation was carried out using counseling and demonstration. This activity was carried out on 25 September 2024 in Samirono Village, which is located in Getasan, Semarang Regency, Central Java. The methods carried out are in the form of education and demonstration which was carried out at the Chairwoman of the Farmer Women Group "Ngudi Rahayu" and was attended by 62 people. The purpose of this education is to increase understanding of the benefits of milk for the environment and human health. The activities aims to increase knowledge about the soap making process.

Before training, a survey has been conducted with village officials, including the village head and several of his staff, to obtain permission to start activities (Figure 1a). This service activity is carried out directly to the community. The target is the woman of the hamlet who are members of the “Ngudi Rahayu” Farmer Women Group (Figure 1b). This community service is carried out through several implementation methods, namely location surveys and partner problems, product manufacturing training and product marketing methods.



Figure 1. Survey and Nameplate of The “Ngudi Rahayu” Farmer Group

2.1. Partner Profile and Problem analysis

The method of this activity begins with information search, namely an on-site survey by the community service team. Information was obtained from asking the village head of Samirono Village and cadres from the village. The target of the service is all member of Ngudi Rahayu Group of Samirono Village who work as cattle breeders so that this training activity can be used to train the people of Samirono Village as one of the home industries to increase income for the community and improve the economy of the residents. Residents of Samirono Village have vacant land in the yard of their houses. The use of vacant land as a medium for Rosemary cultivation becomes more effective and useful as an additional ingredient in the manufacture of environmentally milk soap.

Cow’s milk is one of the leading commodities of the community in Samirono Village, Getasan District, Semarang Regency. Most of the people in Samirono Village work as farmers and breeders. Some people do not have jobs, retirees or take care of households.

To assess the community service prticipants’ level of understanding, pre-test and post-test questionnaires were completed, and the results were analyzed using SPSS.

2.2. Partner Problem Solutions

The training and counseling provided is expected so that the residents of Samirono Village not only sell fresh cow’s milk but can develop other products from the cow’s milk. The development of the product is expexted to increase the value of cow’s milk commodity so that it can improve the welfare of Samirono Village residents. The concept of the solution in table 13 is a follows:

Table 1. Solutions and Achievement Indicators

No	Achievement	Indicator Solution
1	Counseling on how to plant and Use Rosemary	Participants can understand how to grow Rosemary and the use of the flower when added to soap
2	Demonstration of Milk Soap Making	Participants have knowledge and skills in the use of milk in making soap
3	Marketing Management Counseling	Participants have the ability to market the soap products that will be produced

2.3. Socialization Material

At this stage, socialization of material on how to plant rosemary and how to make soap. It is could be divide in several steps as follows:

1. How to cultivate Rosemary

a. Ingredients

Polybags, planting media, rosemary plants

b. Preparation of Planting Media

The planting medium uses a ratio of soil: fertilizer of 1:1

c. Planting of Rosemary

The planting stage begins by wetting the planting medium with water. Put the ready planting medium into the polybag. Rosemary plants are planted in the planting media. Place the polybag in a place that gets sunlight so that it makes germination easier.

2. How to make soap is as follows:

a. Ingredients and tooools.

The ingredients used to make milk soap are NaOH, aquadest, palm oil, coconut oil, olive oil and the tools used to make cow's milk soap are hand blenders, silicone molds for soap, soap cutter and packaging.

b. NaOH solution manufacturing process

The initial stage of the process of making NaOH solution is a weigh NaOH as many formulas. Prepare as many aquades as formula in an aluminium bowl, then add NaOH to the aquades as formula (don't reserve the order). Then stir until dissolved, then let stand until the NaOH solution cools . (Arifan, Fatimah, Broto, & Nur Aisiyah, 2021)

c. Oil Blend Making Process

A Total of 40 grams of fresh cow's milk, 75 grams of palms oil, 50 grams of coconuts oil, and 50 grams of olive oil were mixed evenly. The ratio of the amount of oil can be adjusted by using soap calc aplication.

d. Soap Making Process

The mixing of NaOH solution and oil is carried out when the temperature of the NaOH solution has reached room temperature. The NaOH mixture is poured into the oil solution while stirring. Add additional ingredients such as dried rosemary to taste to the mixture. Stirring is carried out continuously until it thickens, then the dough is poured into the mold. The soap is covered with an insulating cloth and kept in a mold for 1-2 days. The soap is removed from the mold and stored in a dry place for 2-4 weeks before wearing/packaging (Arifan *et al.*, 2021).

2.4. Marketing Management

Understanding marketing materials is needed to prepare for the sale cow's milk soap products. The marketing materials presented include the definition of marketing, marketing objectives, market segmentation, how to market using digital marketing, the advantages of digital marketing, examples of types of media that can be used in marketing, marketing preparation, and marketing strategies to increase turn over

Pongangan, Samirono Village is one of the tourist villages that has several guest houses that can be used as marketing targets. In addition, Samirono Village plans to have a Micro Small and Medium Enterprises (MSME) center so that it can be used as a marketing location. Therefore, marketing-related materials are needed such as how to start marketing, marketing techniques and marketing media.

3. Results and discussion

The service was carried out on September 25, 2024. Participants consisted of women from Pongangan, Samirono Village who participated in this activity, namely in the form of socialization and demonstration. There were 62 members of the Farmer Women Group "Ngudi Rahayu" participating in community service. The production of soap aims to increase public knowledge to be able to utilize milk that may not be sold or has been damaged due to the storage time of milk that cannot be long so that it can reduce the level of environmental pollution by using it in soap.

The activity began with remarks from the Head of Community Service, Mrs Dr. apt. Dwi Hadi Setya Palupi, M. Si (Figure 2a) and representatives from the Ngudi Rahayu" Farmer Group represented by Mrs Marni (Figure 2b). Then continued with material related to the Rosemary Plant and soap making. This socialization of the use of rosemary as an additive in soap and how to make soap made from milk waste, starting with the delivery of material the continued with a demonstration of milk making and ending with an evaluation of public understanding in the form of asking several questions about rosemary plants and how to make soap to the people present. The results obtained from this socialization show that the community understands the use of milk waste for milk production. In addition, people do not realize that milk waste can be used to make soap which can be useful as an antiseptic and can relieve stress and make the body more relaxed.



Figure 2. Remarks from the Head of Community Service (a) and representatives from the Ngudi Rahayu" Farmer Group (b)

3.1. Cultivated Rosemary

Rosmarinus officinalis L. or commonly referred to as rosemary is one of the aromatic plants that has a distinctive smell. Rosemary falls within the scope of the mint family Lamiaceae, as for other examples found in herbal plants such as Oregano, Thyme, Basil and Lavender. This plant has various

benefits that are very important for the body. Some of the things that need to be prepared for rosemary cultivation include:

First, the chosen land or container has a good drainage system. Rosemary is very dislike waterlogging, so excessive water can cause the roots of the plant's stems to rot. The chosen land or container is sufficient height because the Rosemary needs good aeration for its growth.

Second, the soil or planting medium used has a pH between 6 and 7,5. This is because Rosemary can grow well in soil or growing media with that pH. To grow rosemary, it is necessary to mix fertilizer with soil in a ratio of 1:1 because this plant needs enough nutrients to thrive. Rosemary plants to grow need enough sunlight.

Before planting Rosemary, it must be ensured that the seedlings planted are of good quality. Before planting the seeds or seedlings should be soaked in warm water for a few hours to increase their germination rate.



(a) Speaker



(b) Rosemary Plant

Figure 3. Presentation of Rosmery Plant Material

The Rosemary plant is usually used as an additive to cosmetics, beverages additives in cooking, especially on meat steaks. Therefore, the use of Rosemary in this devotion can be used as a scrub in cow's milk soap.

3.2. Soap Making Demo

The speaker conveyed that related to soap materials, including what is meant by soap, namely a good and commonly used cleaning agent, because it is able to clean dirt such as dust and metabolic residues. The best thing about soap as a cleaner is its ability to control a number of pathogenic bacteria so that it does trigger disease ([Mardiana & Solehah, 2020](#)). Soap can be made by means of the saponification process. The saponification process occurs due to the reaction between triglyceides and alkalais which produces a by product in the form of glycerol. Saponification is a reaction of hydrolysis of strong bases (NaOH or KOH) or known as alkaline solutions (lye) so as to produce soap in the form of sodium salts from fatty acids/oils. In this activity, the base used is NaOH with a mixture of three types of oil, namely Zaitun oil, palm oil and coconut oil so that a solid soap is produced that is not too hard soft and smooth.



(a) Speaker



(b) Soap Product

Figure 4. Soap Making Demonstration

3.3. Marketing Management Counseling

The resource person said that marketing is not only aimed at seeking maximum profit by all means. The main goal is to provide satisfaction to customers. Customer satisfaction affects repurchase intentions. Therefore, efforts need to be made to increase customer satisfaction so that customers who are loyal to the product are formed.

Market segmentation is carried out to group the market based on certain categories, for example based on geographic location, demographics and so on. Segmentation is carried out with the aim of improving the quality of service and being able to meet market needs so that effective marketing strategies can be found. Market segmentation that can be carried out by residents of Pongangan Hamlet by grouping types of customers based on demographics and sociographics, which are then targeted at tourists visiting Samirano Village. After getting the target market, the next step is to design a marketing method. The resource person suggested using digital marketing media because it has advantages including being more effective and reaching consumers widely, saving costs and delivering information faster. Some examples of media that can be used are WhatsApp, Telegram, Instagram, Facebook, Twitter, Shopee, Tokopedia, Lazada and other media.

The things that need to be prepared to start a business with digital media such as preparing tools that will be used for marketing such as: social media, brand/product identity, preparing content that attracts attention, can be in the form of photos, videos, uploading content on social media consistently, promoting social media accounts to the public and joining the marketplace. While the strategy to increase turnover is by focusing on improving product quality, creating product innovation by following the times, routinely holding promotions and expanding networks.

3.4 Evaluation

The evaluation is carried out by filling out a questionnaire and giving several questions to the participants in a quiz session, where in this session it can increase the the participants' enthusiasm in participating in the activities and measure the participants' ability to understand the material that has been presented. From this quiz session, there will be a distribution of door prizes for participants who can answer questions from the community service team correctly and accurately.

The results of the evaluation showed that participants could understand how to make milk soap using the aroma of the Rosemary plants, which was indicated by some participants wanting to make soap in this activity. The most of service participants understand the training material, based on an assessment that includes activity topics such as the manufacturing process and the products produced, as well as direct discussions with training participants. The results of SPSS with the Wilcoxon test

showed that there was a significant difference with a p value of 0.00 ($p < 0.05$) between knowledge before and after community service activities. In the figure 5 shows that there was an increase in the knowledge of the mothers of Pongangan residents of Samirono Village who participated in this activity.

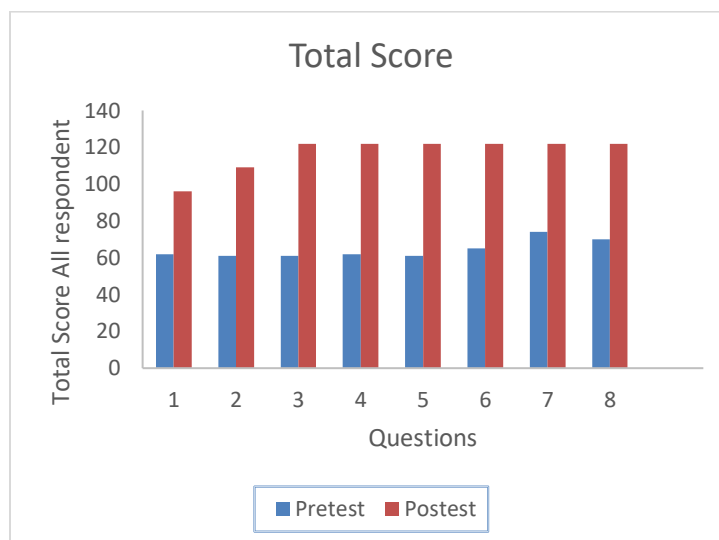


Figure 5. Total Score Pretest and Posttest

This activity ended with closing, giving door prizes with training participants and distributing products that had been made by the community service team as gifts in the form of cow's milk soap. They expected that similar activities could be carried out on an ongoing basis.



Figure 6. End of Doorprize Giving Activity for Participants (a) and Group Photo of All Participants (b)

4. Conclusions

The conclusions was showed the most of service participants increasing knowledge the training material based on an assessment that included the manufacturing process and the products made, as well as direct discussions with the trainees proven by the results of p value < 0.05 . The trainees were able to fully understand the training material and activities shown by the participants desire to make Rosemary soap during this activity.

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6. Authors

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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