Jurnal Kemitraan Masyarakat
Volume. 1 Nomor. 4 Tahun 2024
e-ISSN: 3032-5994; p-ISSN: 3032-6001, Hal. 157-166
DOI: https://doi.org/10.62383/jkm.v1i4.862
Available Online at : https://pkm.lpkd.or.id/index.php/JKM

School Natural Resource Management Education: Utilization of Breadfruit Leaves as Skin Soap Products at SDN Kutisari 2 Surabaya

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Article History:
Received: November 03, 2024;
Revised: November 20, 2024;
Accepted: Desember 03, 2024;
Published: Desember 06, 2024;

Keywords: *Adiwiyata, Breadfruit Leaf Extract, Natural Resources, Skin Care, Soap*

Abstract: *This study explores the potential of breadfruit leaves (Artocarpus altilis) as a raw material in making skin care soap. Breadfruit leaves are known to contain active compounds such as saponins and flavonoids that have antibacterial, antiviral, and antioxidant properties. This study aims to test the effectiveness of breadfruit leaf extract in improving the quality of skin care soap. In addition, this study also highlights the use of breadfruit trees at SDN Kutisari 2 Surabaya, which is one of the Adiwiyata schools. This school utilizes the environment as a means of learning and maintaining the existence of plants, including breadfruit trees, which function as a source of food and traditional medicine. The results showed that soap with breadfruit leaf extract had better cleaning quality and hydrating ability compared to soap without extract. These findings indicate that breadfruit leaves can be a useful ingredient in making skin care products, as well as providing inspiration for the development of more natural and effective soap products, and supporting efforts to conserve natural resources in the school environment.*

Abstrak

This study explores the potential of breadfruit leaves (Artocarpus altilis) as a raw material in making skin care soap. Breadfruit leaves are known to contain active compounds such as saponins and flavonoids that have antibacterial, antiviral, and antioxidant properties. This study aims to test the effectiveness of breadfruit leaf extract in improving the quality of skin care soap. In addition, this study also highlights the use of breadfruit trees at SDN Kutisari 2 Surabaya, which is one of the Adiwiyata schools. This school utilizes the environment as a means of learning and maintaining the existence of plants, including breadfruit trees, which function as a source of food and traditional medicine. The results showed that soap with breadfruit leaf extract had better cleaning quality and hydrating ability compared to soap without extract. These findings indicate that breadfruit leaves can be a useful ingredient in making skin care products, as well as providing inspiration for the development of more natural and effective soap products, and supporting efforts to conserve natural resources in the school environment.

Keywords: Adiwiyata, Breadfruit Leaf Extract, Skin Care, Soap, Natural Resources.

1. INTRODUCTION

Indonesia is a country that has well-organized regulations and protection. As a country that has a legal basis, Indonesia has planned Law Number 32 of 2009 concerning Environmental Protection and Management (PPLH) to maintain the quality of the environment so that it does not decline due to environmental damage that threatens the survival of living things (Pradini et al., 2019). The PPLH program has been designed well in the fields of economy, social and education. The PPLH program in the world of education

is through the Adiwiyata program. The Adiwiyata program aims to create a learning environment based on the environment so that it can create school residents who care and have an environmental culture (Fajarina, 2018).

One of the Adiwiyata schools in Surabaya City is Kutisari 2/269 Elementary School. This elementary school received the Adiwiyata award because it implemented a school activity program that was in accordance with environmental education and utilized the environment as a means and source of learning. One of the efforts of SDN Kutisari 2 Surabaya in maintaining the Adiwiyata school award is by maintaining the school environment and caring for existing school plants to create a beautiful and green school. SDN Kutisari 2 Surabaya has various school gardens, especially the toga garden which is planted with ginger, turmeric, telang and sukun plants.

SDN Kutisari 2 Surabaya has the potential for fertile soil so that it can be planted with breadfruit trees that grow beautifully. In the school area, there are two breadfruit trees that grow and bear fruit, namely in the front yard of the school and inside the school. The Breadfruit Tree (*Artocarpus altilis*) is a plant that belongs to the *Moraceae family* which has many benefits, both its fruit and leaves (Makmun et al., 2022). Breadfruit is widely used as food because it contains protein, vitamins, calcium, magnesium, potassium, which are stored in breadfruit. Meanwhile, breadfruit leaves also contain many contents, such as: Flavonoids, Polyphenols, Quinones, Steroids, Saponins, Monoterpenes, Sesquiterpenes, Phytosterols, Riboflavin, Potassium which can be used as traditional medicine or treatment (Retnaningsih & Hasanah, 2020).

Breadfruit leaves contain flavonoids that function as antibacterial, antiviral, anti-inflammatory, antiallergic, anticancer, and can prevent the formation of free radicals (antioxidants), and minimize wounds caused by the formation of free radicals. So that breadfruit leaves are often used for herbal medicine to cure minor skin diseases, such as rashes, itching and irritation (Audina Frizani & Pawitra Miranti, 2018) There have been many studies that state that the use of breadfruit leaves as a traditional medicine is as a controller of blood sugar levels and cholesterol levels, as an analgesic, anti-inflammatory, antibacterial, and antivirus (Pertiwi & Arisanty, 2020).

The potential of breadfruit fertility and the content of breadfruit leaves are the basis for implementing this research as a step in utilizing school natural resources to create innovative products that have economic value (Fatmawati et al., 2021; Prabowo et al., 2024; Wulandari et al., 2024). In addition, it also increases understanding of the content of

breadfruit plants. The research focuses on the use of breadfruit leaves which contain Flavonoids as antibacterials to cure itchy skin diseases. This utilization is carried out through educational activities to make products in the form of solid soap from breadfruit leaves for itchy skin medicine.

A. Partner Issues

SDN Kutisari 2/269 Surabaya is one of the elementary school education units that received an award as an Adiwiyata school. This school has a beautiful school garden, where the garden is planted with various medicinal plants such as ginger, turmeric, empon-empon, telang and sukun. Therefore, along with the independent learning curriculum education program, about training students to have skills and insight into entrepreneurship, the school wants to carry out an activity that can utilize the school's living environment to produce a real product.

The problem encountered in the field is that SDN Kutisari 2/269 Surabaya cannot utilize the natural resources available at the school, especially breadfruit plants which are potential plants at the school. This problem is caused by the lack of knowledge of students and teachers, limited sources of information related to programs that support processing breadfruit leaves into products with sales value. As well as limited facilities and supporting materials to conduct experiments to create product innovations from breadfruit leaves. Therefore, this school welcomes the School Natural Resource Management Education Program which will be held through training in making solid soap from breadfruit leaf extract with antibacterial content as a medicine for itchy skin, where this making can be done by both students and teachers so that it can create new skills and become an entrepreneurial field for the school.

B. Problem Solution

Based on the problems experienced by the partners, the solutions offered are: 1.) Accompanying partners in this case, grade 4 students of SDN Kutisari 2 Surabaya in collecting data on the potential of natural resources owned by the school so that they can be managed into a product of economic value; 2.) Conducting training and assistance in making herbal soap with breadfruit leaf extract using a simple method that actively involves students; 3.) Providing supporting facilities for conducting experiments, such as blenders, soap molds, and supporting materials for making soap; 4.) Conducting soap product trials on users to get feedback and improve product quality; 5.) Utilizing soap products produced as part of the Adiwiyata school success program in terms of increasing student awareness of environmental management.

2. METODE

The approach method used to realize the training program is an interactive participation approach. The purpose of using an interactive participation approach is to involve the role of teachers and students of SDN Kutisari 2 Surabaya in every stage of planning, implementation, and evaluation of activities. With the type of experimental activity as a method of finding the effect of certain treatments on others in controlled conditions (Basir et al., 2024; Cahya, 2019).

The stages of this training activity include five main phases, namely: preparation, planning, monitoring, evaluation and dissemination of results.

Figure 1. Activity Stages

In phase 1 of preparation, an initial survey was conducted to identify the needs, potentials and problems at SDN Kutisari 2 Surabaya that were relevant, which was intended to design a program plan that was relevant to the problems experienced by partners. Based on the survey results, the potential that can be developed is the utilization of natural resources in schools by looking at the problem that the management of plant products in schools has not been utilized. Phase 2 of planning held discussions with the principal, teachers to formulate program objectives, implementation strategies, and schedules for implementing herbal soap making training programs from breadfruit leaf extract. In phase 3 of implementation, conducting soap making training based on breadfruit leaf extract, which involved students and teachers in the direct experiment process.

After that, in phase 4 monitoring and evaluation, activities are monitored periodically to assess the effectiveness of the results of the production. Evaluation is carried out by collecting feedback from participants regarding the quality, effectiveness, and impact of the products produced. Finally, in phase 5 dissemination of results, findings and results of activities are shared with the community and related parties through presentations, written reports, and participation in the 2024 Youth Research competition. One of the proposals in this phase is the integration of activities into the school curriculum so that this program becomes part of a sustainable learning culture.

A. Tools and materials

The ingredients for making herbal soap from breadfruit leaf extract are as follows:

Table 1. Herbal Soap Ingredients of Sukun Leaf Extract

Material	Amount
Breadfruit Leaf Extract	250 ml
Water	300 ml
Coconut oil	850 ml
Olive oil	200 ml
Essential Oils	200 ml
Dry NaOH	125gr

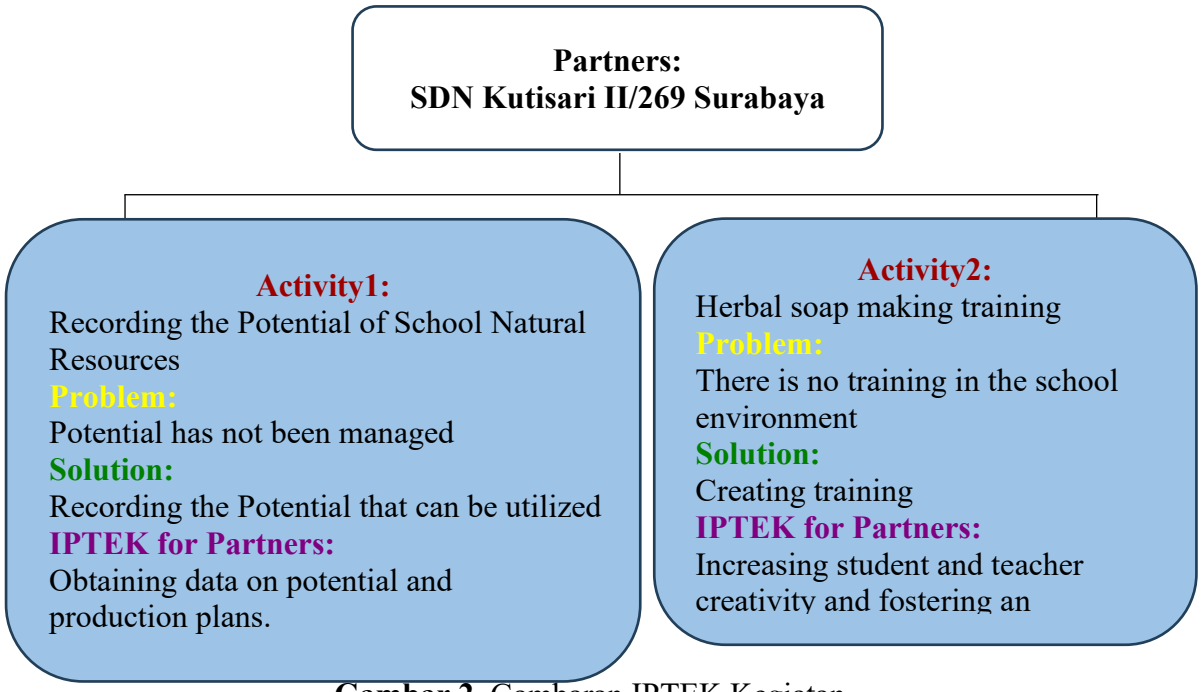
The tools needed are a blender, mixer, pan, wooden spoon, water measure, soap mold, thermometer, digital scale, gloves, mask.

B. Soap Making Training

Soap making will begin with making the extract first by boiling the breadfruit leaves and taking the extract then continuing to make solid soap. The purpose of breadfruit leaf extract is not only to obtain additives but also as a natural dye in soap. The steps for making soap are; (1). Prepare the ingredients and measure according to the size needed; (2). Put the water into a plastic container, mix the NaOH little by little while stirring, let it cool/room temperature; (3). Prepare a different plastic or glass container, mix all types of oil into it then add the oil to the NaOH solution; (4). Stir using a mixer so that it mixes quickly until it thickens with traces; (5). Add the breadfruit leaf extract and stir evenly; (6). Pour each mixture into a mold, store in a closed cardboard box or cover with plastic so that dirt does not enter, leave for 3 nights; (7). After 3 nights the soap will harden and will be dried by storing it in an open place for 30 days; (8). After 30 days, the soap is tested for pH by cutting a small piece of soap, foaming it with water, then measuring it using a pH meter. Soap that meets SNI standards has a pH range of 9 to 11.

3. RESULTS

The community service process at SDN Kutisari 2/269 Surabaya resulted in various dynamics of mentoring that reflected active collaboration between researchers, students, and teachers. In this activity, various activities, namely:



Gambar 2. Gambaran IPTEK Kegiatan

Figure 2. Overview of Science and Technology Activities

Community service activities through "Natural Resource Management Education Through the Utilization of Breadfruit Leaves as Skin Soap Products" at SD Negeri Kutisari II/269 Surabaya took place on April 25, 2024 for the manufacture of Breadfruit Leaf Extract, and on May 4, 2024 for soap making training. This activity was attended by two students, namely Aqhilla Zakiyya and Ayesha Cresentia Nayyara as selected students in the green school program, and one accompanying teacher, namely Emi Supriharti, S. Pd.

The activity began with the provision of education related to the introduction of natural resource potential in schools and material on the content and benefits of each school plant.

Figure 3. Educational Learning and Natural Potential Survey at school

After providing learning related to the introduction of the potential of school natural resources, students then conduct a potential analysis survey. Based on the survey results, data was obtained that breadfruit plants have very fertile potential compared to other plants. Therefore, for the production plan for managing breadfruit plants, it will be selected especially for its leaves because of the content that can be utilized. Furthermore, the activity is continued with direct assistance in making solid herbal soap from breadfruit leaf extract.

In the initial manufacturing process, it is necessary to make soap extract first by boiling and letting the water sit for 1 week. Letting the boiled water sit is done to filter the extract water from the leaf sediment.

Figure 4. Making Breadfruit Leaf Extract

After getting the breadfruit leaf extract, the next step is to make herbal solid soap by preparing the materials and experimental tools and following the steps of making it. This making starts from mixing the ingredients to molding the soap.

Figure 5. Soap Making and Molding

The molded soap is left to harden for 3 days and removed from the mold to be dried by airing in an open space for 30 days so that the soap is perfectly saponified. After 30 days, the pH of the bar soap is measured to ensure it is safe for the skin. The pH according to SNI for solid soap is 9 to 11.

Figure 6. Herbal Soap with Breadfruit Leaf Extract

After making herbal soap, the participants of the activity were asked to make an output of the activity, namely by participating in the BELIA research competition from the Surabaya City Government to test the success of utilizing natural potential in schools. From the research competition, the results showed that the participants were declared to have passed to the finalist stage and had presented the results to the jury.

Figure 7. Documentation of Exhibition of Works

4. DISCUSSION

The results of community service carried out at SDN Kutisari II/269 Surabaya provide an overview of how an interactive participatory approach can create a real impact on increasing local capacity and environmental awareness. This program has succeeded in integrating the potential of natural resources in schools, namely breadfruit plants, especially breadfruit leaves, as the basic ingredient for making herbal soap products from breadfruit leaf extract for skin care.

This activity begins with education about the introduction of natural resource potential in the school environment as well as the content and benefits of the plants. This activity focuses on the benefits of breadfruit leaves. After the educational activity, it was continued with technical training on making soap based on breadfruit leaf extract, and ended by including the results for BELIA research.

The results of the entire series of activities show that participants not only gain new knowledge, but are also involved in a creative process that encourages a sense of ownership of the program. This variety of activities shows the effectiveness of participatory strategies, where participants are empowered to play an active role, from identifying needs to implementing solutions.

This process also creates behavioral changes in the school environment, such as increased concern for environmental management, development of new skills, and awareness of the economic potential of local resources. In addition, the success of the program has given rise to local leaders, both teachers and students, who act as agents of change and motivators for others.

5. CONCLUSION

The implementation of the community service program at SDN Kutisari II/269 Surabaya is an effort to utilize local potential to improve student skills thanks to the same vision and mission between the devotees and partners, namely wanting to improve quality. The herbal soap produced from this activity is 30 pieces of breadfruit leaf extract soap. The soap that has been produced will be included in the BELIA research competition and the product will be exhibited at the results exhibition which is an activity of the Surabaya City Government in with the success of this training program, it is hoped that this herbal soap product can be sustainable so that it can have economic value for schools and students.

6. ACKNOWLEDGEMENTS

Gratitude is expressed to: 1.) Surabaya City Education Office which has held the Surabaya Mengajar Program, 2.) Faculty of Economics and Business, Surabaya State University which has been involved in signing the MOA, 3.) SDN Kutisari II/269 Surabaya l which has been willing to be a partner and provide a place, facilities and support for the implementation of this soap making training program.

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