INNOVATION OF EGG SHELL WASTE AS A DETERGENT POWDER CLEANING STUBBORN CRUST

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ABSTRACT

The use of egg shells is still very rare. Lack of knowledge in utilizing egg shell waste is one of the factors causing the lack of optimal use of egg shells. On the other hand, egg shells which do not have a selling price make people lazy in processing or just cleaning them. One effective way to use egg shells is to process egg shells into stubborn limescale-removing powder detergent. If egg shells have been processed into detergent, there will be many benefits. Apart from cleaning the kitchen from egg shell waste, minimizing the increase in flies that land, and using egg shells to make detergent can be additional work that can make money. We can sell detergent powder from egg shells and the income can increase our income to meet our daily needs.

With the vision of activating the economy through the use of egg shell waste, apart from being determined to empower unused egg shell waste and keeping the kitchen clean, the author also hopes to open up employment opportunities for the community. The problems faced in the use of egg shells to make detergent powder are (1) knowledge regarding the use of eggs to make descaling powder detergent is still very limited while the amount of egg waste continues to grow (2) the problem of lack of training regarding the practice of making descaling detergent powder which comes from egg shells (3) The problem of not yet mastering marketing is to market the production of detergent powder from egg shells.

The method offered as an alternative solution to this problem is (1) Providing knowledge capital regarding innovations in processing powdered detergent products from egg shells (2). Provide training and direct practice on how to make powdered detergent products from egg shells (3) Provide an understanding of the marketing of powdered detergent products from egg shells.

Other benefits that can be obtained include (1) The many benefits of processing powdered detergent products from egg shells making business opportunities wide open (2) a lot of public

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interest in the results of powdered detergent products from egg shells (3) increasing the economic income of producers of powdered detergent products from egg shells egg.

Keywords: product, detergent powder, egg shell waste.

I. Introduction

A. Situation Analysis

Eggs are a food that is liked by all ages and all groups. Starting from the lower class, middle class to upper class. Eggs are also in demand from toddlers to seniors. Eggs can be processed into various food products, ranging from boiled eggs, omelettes, bacem eggs, and eggs are even used as additional ingredients for making other processed foods, such as cakes or meatballs (Kurniawan, 2020).

The large number of eggs consumed every day, both in households and in restaurants, creates the potential for egg shells or shells to be wasted. The remaining egg shells that are not used will only become household waste. Apart from not being able to be sold, egg shells also have the potential to cause a smell and the large number of flies that land can potentially cause disease. Egg shells are an organic waste that is often overlooked, even though the amount of egg production in Indonesia is quite large. With high egg consumption, egg shells have become a significant source of waste in society. According to data from the Central Statistics Agency, egg consumption in Indonesia reaches more than 20 million tonnes per year, which has the potential to produce enormous shell waste. Eggshells consist of calcium carbonate, which has various benefits, including abrasive properties that are effective in cleaning. So far, people often throw away egg shells without utilizing the existing potential. This not only causes a buildup of waste, but also eliminates the opportunity to create useful and environmentally friendly products (Suhartono, 2019).

The use of egg shells is still very rare. Lack of knowledge in utilizing egg shell waste is one of the factors causing the lack of optimal use of egg shells. On the other hand, egg shells which do not have a selling price make people lazy in processing or just cleaning them. One effective way to use egg shells is to process egg shells into stubborn limescale-removing powder detergent. If egg shells have been processed into detergent, there will be many benefits. Apart from cleaning the kitchen from egg shell waste, minimizing the increase in flies that land, and using egg shells to make detergent can be additional work that can make money. We can sell powdered detergent from egg shells and the income can increase our income to meet our daily needs (Wahyuni, R. 2021).

In the context of cleaning, many commercial detergent products contain chemicals that can harm health and the environment. Therefore, there is a need to look for more natural and safer alternatives. Utilizing egg shells as powdered detergent offers an innovative solution. This product is not only effective in cleaning scale and dirt, but also reduces the negative impact of waste and contributes to reducing the use of hazardous chemicals (Setiawan, B., & Sari, R. 2022).

Against this background, the use of egg shells as powdered detergent is important, both from an environmental and health perspective. This innovation can encourage people to care more about waste management and increase awareness about the importance of using environmentally friendly products. The development of this product is also in line with the principle of sustainability, where existing resources are used efficiently and responsibly. Egg shell waste is a type of organic waste that is often overlooked. In Indonesia, high egg consumption causes significant shell waste to arise. In fact, egg shells contain calcium carbonate which can be utilized. One innovation that can be carried out is processing egg shell waste into descaling detergent powder. This article will discuss the potential and steps for utilizing egg shell waste as an environmentally friendly cleaning product (Sulistyaningrum, 2023).

Egg shell waste is a type of organic waste that results from high egg consumption in Indonesia. Egg shells contain calcium carbonate and other beneficial minerals. This research aims to process egg shell waste into environmentally friendly cleaning powder detergent. With the vision of activating the economy through the use of egg shell waste, apart from being determined to empower unused egg shell waste and keeping the kitchen

clean, the author also hopes to open up employment opportunities for the community. The problems faced in the use of egg shells to make detergent powder are (1) knowledge regarding the use of eggs to make descaling powder detergent is still very limited while the amount of egg waste continues to grow (2) the problem of lack of training regarding the practice of making descaling detergent powder which comes from egg shells (3) The problem of not yet mastering marketing is to market the production of detergent powder from egg shells.

The method offered as an alternative solution to this problem is (1) Providing knowledge capital regarding innovations in processing powdered detergent products from egg shells (2). Provide training and direct practice on how to make powdered detergent products from egg shells (3) Provide an understanding of the marketing of powdered detergent products from egg shells. Other benefits that can be obtained include (1) The many benefits of processing powdered detergent products from egg shells making business opportunities wide open (2) a lot of public interest in the results of powdered detergent products from egg shells (3) increasing the economic income of producers of powdered detergent products from egg shells egg.

Figure 1. Egg shell waste

B. Problems in the Field

The problems faced in the field are:

(1.) the problem of accumulated egg waste

(2.) the problem of egg waste has no selling value

(3.) systems and techniques for increasing production,

(4.) Knowledge regarding the use of eggs to make descaling powder detergent is still very limited, while the amount of egg waste continues to grow

(5.) the problem of lack of training regarding the practice of making descaling detergent powder derived from egg shells

(6.) The problem is that we have not yet mastered marketing to market the production of detergent powder from egg shells.

Efforts to handle problems include:

(1) Increasing knowledge about the use of egg shell waste

(2) Converting leftover eggs into powdered detergent which has sales value

(3) Providing knowledge about systems and techniques to increase production.

(4) Providing knowledge capital regarding innovations in processing powdered detergent products from egg shells

(5) Provide training and direct practice on how to make powdered detergent products from egg shells

(6) Provide an understanding of the marketing of powdered detergent products made from egg shells.

C. Target and Outcome

The aim of this training activity is to improve skills and increase economic income in processing egg waste into an attractive product innovation, namely detergent powder which is rich in benefits. Community service program activities in the form of utilizing egg waste into detergent powder with activities in the form of training are relevant to the need for mastery of the use of materials that are abundant and underutilized into processed innovative products. In the implementation of this service program, the aim is to increase participants' knowledge regarding mastery. and the application of knowledge in terms of product processing, namely the application of materials to be applied to a product.

As a target for participants in community service, the existence of a community service program in the form of training in making powdered detergent from egg waste is able to help them increase their knowledge regarding the techniques and processes of using egg waste to make powdered detergent that has sales value. Processing egg shells into scale-removing detergent powder aims to create selling value for processed products from egg shell waste which can ultimately increase economic income.

To overcome the problems that occur, several handling strategies are needed that can provide the right solution which can be explained according to table 1 below:

Problems	Solution
1) the problem of accumulated egg waste 2) the problem of egg waste has no selling value 3) systems and techniques for increasing production, 4) Knowledge regarding the use of eggs to make descaling powder detergent is still very limited, while the amount of egg waste continues to grow 5) the problem of lack of training regarding the practice of making descaling detergent powder derived from egg shells 6) The problem is that we have not yet mastered marketing to market the production of detergent powder from egg shells.	1) Increasing knowledge about the use of egg shell waste 2) Converting leftover eggs into powdered detergent which has sales value 3) Providing knowledge about systems and techniques to increase production. 4) Providing knowledge capital regarding innovations in processing powdered detergent products from egg shells 5) Provide training and direct practice on how to make powdered detergent products from egg shells 6) Provide an understanding of the marketing of powdered detergent products made from egg shells.

D. Implementation Method

The implementation of activities is carried out using four methods, namely:

1. Survey And Interviews

   The survey was conducted directly in the household kitchens of Community Service partners. Interviews or direct questions and answers by implementers to partners about what happens if lots of leftover eggs are left every day and just pile up. Another question is about what processed products from egg shell waste are currently produced. From the results of surveys and interviews, the implementers expressed the idea of processing egg shell waste products into descaling detergent powder (Sulistyaningrum, 2024).

2. Practice

   The practice is carried out jointly by participants in the bontil livestock group with guidance from the implementer. Implementing members are provided with video tutorials and implementation modules for processing eggshell waste products into descaling detergent powder. The practice is carried out at the home of one of the Community Service partners.

3. Module

   The use of the module in this training is intended to serve as reference material for participants to find out how to make milk into a processed nugget product. The module contains, among other things, information on tools, ingredients and how to make Etawa goat's milk nuggets.

4. Evaluation Plan

   In implementing this community service program, there are 3 criteria which serve as basic benchmarks for the achievement of training activities. These benchmarks are (Suryadi, 2023):

   1) The benchmark for the success of implementing activities is carrying out activities according to the time and number of meetings that have been

determined, so there needs to be good communication and cooperation between implementers and participants.

2) Measures of success for participants include: being able to apply or practice and know the methods used to process eggshell waste products into descaling detergent powder.
3) Benchmarks for the success of the implementer include: being able to provide explanations and assistance that can help participants in practicing and knowing the methods used to make egg shell waste products into descaling detergent powder.

The division of tasks is presented in table 2 below:

No	Description	Participation
1	Implementation Team	1. Carry out activity planning, activity implementation and reporting 2. Lead and facilitate the FGD 3. Prepare production training 4. Ensure the implementation of health protocols in every activity carried out 5. Monitor partner activities
2.	Partner	1. Prepare the place and activity participants who are members of the partner group 2. Procure raw materials for production 3. Support all implementation activities so that they can be carried out in accordance with predetermined plans

II. Results and Discussion

Implementation of community service program activities is divided into several stages, namely: the first stage is a survey by the implementing party to partners which is carried out at the location of the Community Service partner. During the survey process, interviews or direct questions and answers were conducted by the implementers to partners about what would happen if lots of leftover eggs were left

every day and just piled up. Another question is about what processed products from egg shell waste are currently produced. From the results of the survey and interviews, the implementers expressed the idea of processing egg shell waste products into descaling detergent powder. From the results of the discussion, it was agreed that training would be held on processing eggshell waste products into descaling detergent powder

The second stage is the practice of making descaling detergent powder from egg shell waste. The practice is carried out jointly by Community Service partner group participants with guidance from one of the implementing members. Implementing members are provided with video tutorials and implementation modules for processing egg shell waste products into descaling detergent powder. The use of the module in this training is intended to serve as a reference material for participants to find out how to make egg shell waste products into descaling detergent powder. The module contains, among other things, information on tools, materials and methods for making egg shell waste products into descaling detergent powder.

The third stage is an evaluation of the plan and realization of the implementation of activities to process egg shell waste products into descaling detergent powder

Implementation Step

1. Presentation
   The organizer presented the benefits of egg shells and the products that can be produced from waste egg shells into descaling detergent powder, as well as their selling value if they have been converted into a processed product that is ready to be sold.
2. Selection of materials
   The material chosen was egg shell waste originating from PKM partner groups. At this stage, the aim is to educate partners that egg shell waste can be used to make descaling powder detergent products

Figure 2. Eggshell waste material

3. Tool design or design

   Making descaling powder detergent from egg shell waste requires the following tools: a basin (for washing dirty egg shell waste), a large pan (for boiling washed egg shells), a filter (for filtering clean washed egg shells), a tampah or layah (for heating or drying in the hot sun), a blender that will be used to blend dry and clean eggshell waste, a bowl or container to hold the blended eggshell powder, a spoon for pouring.

Figure 3. Design of tools and machines

4. Material Processing

   The aim of the material processing stage is to provide examples to partners so they can process egg shells into powdered detergent. The first thing to do is prepare the necessary tools and materials. Collect 0.25 kg of unused egg shells. Then wash and rinse before boiling. This is done so that the egg shell is free from visible dirt and is not visible to the eye. Another goal is to remove the mucus that is still attached to the egg shell. The next stage is to boil the washed egg shells for 15 minutes using boiling water at 100 Celsius. The aim of this stage is to remove bacteria, because bacteria will die at a temperature of 100 Celsius. This is also done to remove the fishy smell on the egg shells. The next stage is to discard the used cooking water and dry the washed egg shells in the sun for 1 hour. The goal of this stage is to make the egg shells hygienic and heated naturally in the sun.

Figure 4. Stage of drying in the sun

The next stage is to smooth or reduce the size of the dried egg shells with a hammer and then blend until a perfect powder is formed.

Figure 5. Stage of smoothing egg shells

The resulting egg shell powder is then added with 1 tablespoon of baking soda. The next stage is adding 3 tablespoons of cleaning soap powder. Egg shell powder, cleaning soap powder, and baking soda are then mixed together.

Figure 6. Stage of adding baking soda and detergent powder

To make the mixing process easier, use a blender. Each stage has been carried out, so the final stage is to store it in a closed container. How to use egg shell detergent is like normal detergent powder. Sprinkle it on tools or crusty areas, add water, and clean. Then the tool or crusty place will be easier to clean.

Review

Egg shells are made from calcium carbonate which has abrasive properties. Apart from that, egg shells also contain other minerals such as magnesium, phosphorus and collagen. Use this powdered detergent to clean scale on kitchen equipment such as stoves, sinks and other equipment. Just sprinkle a little detergent on the dirty area, then rub with a damp sponge or cloth. The benefits of using egg shells include:

1. Environmentally Friendly: Reduces organic waste and utilizes existing resources.
2. Economical: Reduces the production costs of commercial detergents which often contain dangerous chemicals.
3. Natural Abrasive: Effective in removing scale and dirt without damaging the surface.

Figure 7. Results made by participants

5. Displays

   Powdered detergent from eggshell waste that has been produced and has been produced is then packed into plastic tips. Next is marketing. Marketing is carried out online and offline. Via online, one of them is selling on story wa, on Instagram and Facebook. Offline sales are carried out by leaving the detergent product to be

sold at the nearest stall or shop. Once the detergent powder is ready, the next step is to do a test run. This trial was carried out by using detergent on various types of crust, such as on stoves, sinks and other kitchen equipment. The results show that powdered detergent from egg shells is quite effective in removing scale and dirt, and does not damage the surface of the material being cleaned.

Figure 8. product powder detergent

6. Closing

Utilizing egg shell waste as a descaling powder detergent is one promising innovation. Apart from reducing waste, this product is also environmentally friendly and economical. With appropriate training and outreach, it is hoped that the public can better understand and apply this innovation, thereby creating a cleaner and healthier environment. Community service through this innovation is a real step in preserving the environment while improving the quality of life of the community. The final stage of this community training is a farewell by the implementing team to community service partners.

Figure 9. Results of processed products that are ready to be marketed

III. Conclusion

The aim of this training activity is to improve skills and increase economic income in processing egg waste into an attractive product innovation, namely detergent powder which is rich in benefits. Community service program activities in the form of utilizing egg waste into powdered detergent with activities in the form of training are relevant to the need for mastery of the use of materials that are abundant and underutilized into processed innovative products. In the implementation of this service program, the aim is to increase participants' knowledge regarding mastery. and the application of knowledge in product processing, namely the application of materials to be applied to a product.

As a target for participants in community service, the existence of a community service program in the form of training in making powdered detergent from egg waste is able to help them increase their knowledge regarding the techniques and processes for using egg waste to make powdered detergent that has sales value. Processing egg shells into scale-removing detergent powder aims to create selling value for processed products from egg shell waste which can ultimately increase economic income. Making detergent powder from egg shells is a simple and environmentally friendly process. By following the steps above, people can utilize waste that is usually thrown away, while creating effective and safe cleaning products.

Suggestions for further service are to carry out training with a wider scope, not just limited to small ones.

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