

Formulation of Scrub from Guava Leaf Extract (*Psidium guajava* L) and White Glutinous Rice (*Oryza sativa glutinosa*) with Emulsifier Variations

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A B S T R A C T

Background: Guava leaves contain alkaloids, saponins, flavonoids, tannins and anti-mutagenic and antioxidants that can be beneficial for skin beauty, such as moisturising, brightening the skin, reducing redness, irritation, acne and refreshing and eliminating unpleasant odours. **Objectives:** This study aims to determine whether guava leaf extract (*Psidium guajava* L) and white glutinous rice (*Oryza sativa glutinosa*) can be formulated into a body scrub with variations of emulsifiers and to determine whether the body scrub preparation made with two variations of emulsifiers is physically stable through organoleptic tests, pH tests, spreadability tests and skin irritation tests. The type of research used is experimental research in the Laboratory. **Method:** The extraction used is the maceration method using 96% ethanol solvent. **Results:** The study showed that guava leaf extract (*Psidium guajava* L) and white glutinous rice (*Oryza sativa glutinosa*) with variations of emulsifiers can be formulated into a body scrub cream with good results of organoleptic physical evaluation tests, pH tests, spreadability tests, irritation tests and fulfilling the test requirements on the three formulations made. Thus, the scrub preparation is said to be safe for use. **Conclusion:** that guava leaf extract (*Psidium guajava* L) and white glutinous rice (*Oryza sativa glutinosa*) can be formulated into a body scrub cream with variations of emulsifiers. From the results of physical evaluation tests carried out on three formulations with variations of emulsifiers, all formulas can be said to be good because the tests that have been carried out meet good physical stability evaluations, including organoleptic testing, pH measurements, spreadability measurements and skin irritation tests, where all formulations successfully meet the specified criteria.

INTRODUCTION

Cosmetics have become an essential part of daily routines, used consistently with the increasing population as well as the ever-growing market demand (Rachmawati) *et al.*, 2021). Our skin is exposed to UV rays and air pollution every day, which can make the skin look dull, dry and can lose moisture. Therefore, it is important to use bodyscrub products or commonly known as scrubs, using the right bodyscrub or scrub can provide nutrients to the skin. The benefits of using a bodyscrub or scrub are very diverse, because using soap alone is not effective enough without being accompanied by additional treatments, for example such as bodyscrub (Hairiyah *et al.*, 2022). Scrubs are a type of cosmetic for the skin that cleanses pores and has the ability to remove dead skin cells. Thus, the skin detoxification process becomes better and the body has the ability to absorb nutrients better (Arisma, 2018).

Guava leaves (*Psidium guajava* L.) contain antibacterial substances in the form of saponins, tannins and flavonoids. Guava Leaf Extract (*Psidium guajava* L.) The positive ones have flavonoids and have antioxidant activity are formulated into cosmetic preparations (Promise) *et al.*, 2024). Antioxidants play an important role in neutralizing free radicals by supplying the needed electrons, so that they are able to stop or inhibit the occurrence of a chain reaction that can be destructive. Antioxidants can function as hydrogen radical donors as well as free radical receptors in the body (Sari, 2015).

Guava leaves are extracted by maceration, which is an extraction technique by cold without heating. The main goal in this method is to remove all the chemical compounds contained in the sample. Maceration is carried out at room temperature for several days, with occasional light stirring periodically to help the extraction process of the active substance optimally (Nurwanti *et al.*, 2023). In making scrubs, the stability of an emulsion preparation is influenced by several factors, namely emulsifiers, temperature and time. The addition of emulsifiers or emulsifiers is necessary for the manufacture of cream, this can affect the stability and quality of a cream preparation (Opod) *Et al.*, 2024) In this study, stearic acid and cetyl alcohol are the ingredients as emulsifiers.

Based on research that has been conducted by (Fitriani *et al.*, 2024) Making scrubs using the active substance of guava leaf extract which contains antioxidants, antioxidants themselves are useful for cleaning pores, removing dead skin cells and delaying aging. Based on research that has been conducted by Hairiyah *et al.*, (2020) Using White Glutinous Rice as a Scrub in Making Scrubs and in Research Sari *et al.*, 2020) about two variations of emulsifiers that can affect the physical stability of the preparation.

Looking at the background and results of previous research that showed the potential of guava leaf extract as an active substance in the manufacture of cosmetic products, the researcher encouraged further research. This research is focused on the formulation of scrubs by utilizing guava leaf extract (*Psidium guajava* L) as an active component and white glutinous rice (*Oryza sativa glutinosa*) as a powder and using varicose emulgator varieties in the formulation.

METHOD

The research used is laboratory experimental research. The samples used were guava leaves and white glutinous rice taken in the city of Baubau. The research has been conducted from May-July 2025 at the Pharmaceutical Laboratory of the BauBau Polytechnic and the Mandala Waluya Pharmaceutical Laboratory. The tools used in the implementation of this study were 40 mesh sieves, 200 g scales, stirring rods, blenders, bunsen, porcelain cups, beaker cups, measuring cups, watch glasses, preparation glasses, tripods, filter paper, trays, mixers, pH meters, rotary evaporators, dips, horn spoons, digital scales and bodyscrub containers. The ingredients used in this study were guava leaf extract (*Psidium guajava* L), white glutinous rice powder (*Oryza sativa glutinosa*), 96% ethanol, aquadest, stearic acid, cetyl alcohol, triethanolamine, propylene glycol, methyl paraben and perfume.

Formulation

Table 1. Formulation Design of Scrub from Guava Leaf Extract (*Psidium guajava* L) and White Glutinous Rice (*Oryza sativa glutinosa*) with Emulsifier Variations

Material	Formula %			Uses
	F1	F2	F3	
Guava Leaf Extract	2	2	2	Active substances Scrub
White glutinous rice	5	5	5	
Stearic Acid	10	5	10	Emulsifier
Acetyl Alcohol	5	10	10	Elmugator
Methyl Paraben	0,16	0,16	0,16	Preservatives
Triethanolamine	3	3	3	
Propylene glycol	10	10	10	Softener
Perfume	0,5	0,5	0,5	Aroma
Aquadest Ad	100 mL	100 mL	100 mL	Solvent

Sample Processing

Picked guava leaves (*Psidiumgiajava* L) then washed thoroughly under running water to remove dirt. After that, it is sliced or cut into small pieces and dried in the sun until it is completely dry. When it has dried completely, then it is blended using a blender to form a belt of simplicia. The resulting powder is then stored in a sealed container and ready for use for further processing (Ekayani *et al.*, 2021). 100 grams of rice is washed clean, then dried until completely dry, then in a blender but not too fine to produce grains *Scrub* (Eflina and Astuti, 2021).

Extraction Process

The extraction process is carried out by weighing 500 grams of guava leaf simplicia powder (*Psidium guajava* The powder was then soaked in 3000 mL of 96% ethanol in a glass jar. The maceration process lasts for three days by doing routine stirring every day at the same time, to ensure a well-balanced mix. After the soaking period is completed, then it is filtered to separate the fibers, then the tool *Rotary Evaporator* used to produce familiar extracts (Firmansyah *et al.*, 2023).

Working Procedure

This formulation is made in two stages: the oil phase and the water phase. Stearic acid and cetyl alcohol are present in the oil phase, and aquadest, propylene glycol, triethanolamine and methyl parabens are in the water phase.

The first step in mixing scrub cream is carried out by measuring stearate acid for FI 10 grams, FII 5 grams and FIII 10 grams, then weighing cetyl alcohol for FI 5 grams, FII 10 grams and FIII 10 grams. After both ingredients are mixed with aquades, *the hot plate* is heated to 70°C. The water phase was made by measuring propylene glycol for FI 10 mL, FII 10 mL and FIII 10 mL, weighed TEA for FI 3 mL, FII 3 mL and FIII 3 mL, then methyl paraben for FI 0.16 grams, FII 0.16 grams and FIII 0.16 grams. Put it in a *beaker* glass and add aquades and then heat on a *hotplate* at a temperature of 70°C.

The oil phase and the water phase are mixed in a beaker, then stirred using a mixer until well mixed until it forms a cream and white glutinous rice powder is added (*Oryza sativa glutinosa*) for FI 5 grams, FII 5 grams and FIII 5 grams then add perfume for FI 0.5 mL, FII 0.5 mL and FIII 0.5 mL then add guava leaf extract (*Psidium guajava* L) for FI 2 grams, FII 2 grams and FIII 2 grams into a beaker little by little then mixed-er until homogeneous (Agata and Jayadi, 2022).

Physical Evaluation Test

pH Test

The organoleptic test of the preparation is carried out by preparing each of the scrub preparations that have been made. Furthermore, the appearance of the scrub preparation was observed with the sense of sight and smell of smell, color and shape, and the results of the observations obtained were recorded (Agata and Jayadi, 2022).

pH Test

The pH test of the preparation is carried out by dipping the pH meter into the preparation and then recording the pH value written digitally. The sample was made in a concentration of 1% i.e. weighed 1 g of the preparation and dissolved in 100 ml of aquadest. Then the pH device is dipped in the solution. Allow the appliance to show a pH value until it is constant. The pH of the preparation is indicated by the pH meter number (Lucy *et al.*, 2023).

Dispersion Test

Weigh 0.5 grams of scrub cream, then place it right in the middle of the preparation glass. On top of the sample, the preparation glass was placed again, then let it sit for one minute to observe and record the diameter of the spread. Next, a load weighing 200 grams is added to it and let it sit again for one minute, then note the diameter of the spread (Nurhidayati *et al.*, 2024). Dispersion power test requirements for topical preparations of 3 to 5 cm (Heshakaya *et al.*, 2022).

Irritation Test

This test is performed to assess the extent of the skin's reaction to the use of scrubs or *Body Scrub* with various formulations. This test involved a number of female panelists, where the product was applied to the bottom of the arm. The results obtained in the evaluation are based on the appearance or absence of irritating symptoms, such as redness, itching, hot sensation or swelling. If no reaction is found, then it is marked with (-), if the skin is itchy, then mark it with (+), if there are red spots on the skin, mark it with (++) , if you experience heat on the skin, mark it with (+++) and if it is swollen, then mark it with (++++). All observations were made within 15 minutes after the product was applied to the skin (Aryani *et al.*, 2019).

RESULTS & DISCUSSION

Alkaloids, saponins, flavonoids, tannins, and alkaloids are some of the compounds found in guava leaves that have anti-mutagenic and antioxidant properties. These compounds can improve the appearance of the skin by moisturizing, brightening, reducing redness, irritation, and acne, as well as refreshing and eliminating bad odors.

Extraction Results

Table 2. Presentation results of guava leaf extract (*Psidium guajava* L)

Sample Weight	Weight of Guava Leaf Extract	Yields
503.5 g	24.7 g	4,9%

Source: Primary Data, 2025

Guava leaves (*Psidium guajava* L.) are extracted through a process known as maceration, in order to produce a thick extract. Three liters of 96% ethanol solvent were used to macerate 500 grams of guava leaf simplicia powder (*Psidium guajava* L) for three days, with occasional stirring every day. After that, filtration or filtration is used to filter it. Evaporation is carried out using a *rotary evaporator* until 24.7 grams of thick extract is obtained.

Organoleptic Test Results

Table 3. Organoleptic test

Formula	Color	Smell	Texture	Picture
FI	Light brownish green	Typical perfume	Less Thick	
FII	Dark brownish green	Typical perfume	slightly thick	
FIII	Dark brownish green	Typical perfume	thicker	

Source: Primary Data, 2025

The results of organoleptic tests from FI are light brownish-green color, distinctive smell of perfume, slightly thick texture. FII, namely, brownish-green color, typical smell of perfume, not too thick texture and FIII which shows dark brownish-green color, typical smell of perfume, thick texture. From the results carried out, there is a color difference between FI, FII and FIII. The difference in color can be influenced by variations in the concentration of stearic acid and cetyl alcohol serving as the base that forms into the cream. The concentration of 5% cetyl alcohol produces a lighter cream consistency, so that the color of the extract appears lighter, namely light brownish-green, while FII and FIII each get a concentration of 10% cetyl alcohol, this makes the cream more concentrated so that the color of guava leaf extract (*Psidium guajava L*) looks darker, namely dark brownish-green. Although the resulting colors are different in FI, but they are the same in FII and FIII, all three formulas still exhibit good organoleptic characteristics and are accepted.

pH Test Results

Table 4. pH Test

Formula	Testing	Condition	Information	Picture
FI	7.80	4,5-8	Qualify	
FII	7.69	4,5-8	Qualify	
FIII	7,71	4,5-8	Qualify	

Source: Primary Data, 2025

The pH value of each scrub remains within the range of the pH value determined by SNI 16-4399-1996 as the quality standard for skin moisturizers, which is 4.5 to 8.0 (Adhani *et al.*, 2023). The pH test of the scrub showed that all formulas I, II and III met the skin's pH requirements. The pH test result of FI is 7.80, FI is 6.69 and FIII is 6.71.

Dispersion Test Results

Table 5. Dispersion Test

Formula	Dispersion test (cm)	Requirements (cm)	Information
FI	4,7	3-5	Qualify
FII	5	3-5	Qualify
FIII	4,5	3-5	Qualify

Source: Primary Data, 2025

The results of the dispersion test showed an FI of 4.5 cm, FII of 5 cm and a FIII of 4.7 cm. Judging from Table 5, all *body scrub cream formulas* meet the requirements for good spreadability. This difference in dispersion is also influenced by variations in the concentration of stearic acid and cetyl alcohol between FI and FII and FIII. In FI with a concentration of 5% cetyl alcohol it produces less thick cream so that the dispersion is slightly smaller, in FII the ratio of 5% stearic acid and 10% cetyl alcohol is very balanced and produces a tissue structure that is not too liquid or too thick, so that the spread is wider. Meanwhile, FIII is due to the concentration of 10% cetyl alcohol and 10% stearic acid resulting in thicker scrubs so that the spread is limited. Despite the differences, all formulas still meet the requirements of good dispersability.

Skin Irritation Test

Table 6. Skin Irritation Test

Formula	Redness	Freckles	Hot	Itch
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FI	-	-	-	-
FII	-	-	-	-
FIII	-	-	-	-

Source: Primary Data, 2025

The irritation test was conducted to assess the extent to which a sample of *body scrub* cream can trigger an irritating reaction on the skin, based on each formula that has been tested on the panelists. The goal is to find out the level of safety of each formulation variant. From the test results, it can be seen that the control sample applied to the five panelists did not cause any signs of irritation. Based on these data, scrub creams containing guava leaf extract (*Psidium guajava* L) and white glutinous rice (*Oryza sativa glutinosa*) with emulsifier variations can be declared safe to use.

COVER

Based on the results of the research that has been carried out, it is found that guava leaf extract (*Psidium guajava* L) and white glutinous rice (*Oryza sativa glutinosa*) can be formulated into *body scrub scrub cream* with a variety of emulsifiers. From the results of the physical evaluation test carried out from three formulations with emulsifier variations, all formulas can be said to be good because the tests that have been carried out meet the evaluation of good physical stability, including organoleptic testing, pH measurement, dispersion measurement and skin irritation testing, where all formulations successfully meet the set criteria. This study has limitations, namely the source of guava leaves and glutinous rice only comes from one location. It is recommended that the researcher then use a comparison with several locations.

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