

Organoleptic, Moisture and Irritation Tests on Scrubs Based on Coffee Grounds, Aloe Vera, and Liquid Soap Based on Used Cooking Oil, Olive, and Castor

Syamsul Bakhri¹, Gusnawati², Rilda Yasifa Idzinih³, Dhea Kirana Faradila Amir⁴

Chemical Engineering of Study Program, Faculty of Industrial Technology, Indonesian Muslim of University, Makassar City, Indonesia

ABSTRACT: Body scrub is a cosmetic product which is the result of technological developments to remove dead skin cells, dirt and open pores so that the skin becomes healthier, brighter and whiter. **Published Online: July 06, 2024**

Making body scrubs can be done using coffee grounds, aloe vera and liquid soap as raw materials. Based on previous research which used coffee grounds and liquid soap based on used cooking oil and olive oil to make a body scrub that has good moisture and anti-irritation on the skin but anti-microbial testing has not been carried out, so the author took the initiative to continue this research with the addition of castor oil in liquid soap and aloe vera in making body scrubs, with the hope that the resulting body scrub formulation will be very good in Organoleptic Tests, pH, Moisture and Anti-irritation on the skin, and Antimicrobial. The composition of the liquid soap used consists of used cooking oil, olive oil and castor oil. The composition of the raw materials for making body scrubs consists of fixed variables and changing variables. The fixed variable consists of 37 g liquid soap and 3 g cornstarch, the changing variable consists of aloe vera and coffee grounds whose formulations are 20 g and 40 g (V1), 30 g and 30 g (V2), and 40 g and 20 g (V3). The three body scrub formulations produced will be analyzed after undergoing organoleptic, pH and humidity testing, while the irritation level test is characterized by itching, redness and swelling. The methods used in making liquid soap and body scrub formulations are experimental. Testing for bacterial inhibition in liquid soap used the in vitro method, and organoleptic, pH, humidity and irritation level testing of the resulting liquid soap and body scrub formulations was carried out through descriptive tests using analytical observational methods. Test results show that a body scrub containing a lot of aloe vera can moisturize the skin and does not irritate the skin, and is suitable for us.

Corresponding Author:
Syamsul Bakhri

KEYWORDS: Coffee Grounds, Aloe Vera, Liquid Soap

INTRODUCTION

Kulit The skin is the outermost organ that functions to protect the body from external disturbances (Bakhri, Suryanto, Zainal, & Fidya, 2024). The skin is often exposed to sunlight and pollution every day, this causes the skin to become dull, dry and lose moisture, therefore it is necessary to use the right body scrub product to nourish the skin. Body scrub is a product that is the result of today's rapid technological developments, body scrubs are used to keep body skin clean and fresh, body scrub products vary greatly starting from price, packaging color, soft texture and aroma. The aim of using a bodyscrub is to remove dead skin cells, dirt and open pores so that the skin becomes brighter and whiter (Hairyan & Nuryati, 2020).

Various kinds of ingredients, including herbs, have been developed as the main ingredients of body scrubs. One example is coffee grounds. There are many chemical components in coffee such as caffeine, chlorogenic acid, trigoneline, carbohydrates, fats, amino acids, organic acids, aroma volatiles and minerals. Chlorogenic acid can protect the skin from microorganisms, insects and UV radiation. In making this body scrub, traditional coffee grounds are used. Coffee grounds contain ingredients that are good for the skin, such as antioxidants including flavonoids and polyphenols. Coffee grounds also contain chlorogenic acid which can protect the skin from microorganisms, insects and UV radiation, as well as act as an antidote to free radicals. In this research, the coffee grounds used were obtained from traditional coffee sold in traditional markets. Where we brew the coffee and then take the grounds to dry to use as raw material for making body scrubs (Puspitasari, et al., 2020).

Syamsul Bakhri et al, Organoleptic, Moisture and Irritation Tests on Scrubs Based on Coffee Grounds, Aloe Vera, and Liquid Soap Based on Used Cooking Oil, Olive, and Castor.

The body scrub made in this research uses coffee grounds with the aim of reducing waste in the community and increasing the economic value of coffee drink waste in the community. Because the presence of waste is always considered negative for the environment, even though not all waste is detrimental to the environment, such as coffee grounds which can be used as a body scrub.

Based on previous research entitled, "Making Body Scrub from Coffee Grounds and Liquid Soap Based on Used Cooking Oil and Olive Oil", the research will continue the results of our research. The latest in this research is the addition of castor oil to the liquid soap formula and aloe vera to the body scrub. The aim of this research is to determine the formulation of raw materials for coffee grounds and aloe vera in making a body scrub that is good for organoleptic tests, moisture and levels of irritation on the skin.

RESEARCH METHODOLOGY

1. Tools and Materials

The tools used in this research were pans, stick blenders, hand whiskers, rubber spatulas, hotplates, measuring cups, analytical scales, thermometers, water baths, stirrers, pH meters, and storage container.

The ingredients used in making liquid soap are used cooking oil, castor oil, olive oil (herborist brand), alkali (KOH), distilled water, and citric acid. The used cooking oil used is cooking oil derived from palm oil which has been used more than three times and is blackish brown in color, which has been purified so that the color of the used cooking oil used as a base in this research is brown. The composition of the raw materials for making liquid soap can be seen in Table 1.

Table 1. Composition of Raw Materials for Making Liquid Soap

Objects of Research								
	Used Cooking Oil	Olive Oil	Castor Oil	KOH liquid		Asam Sitrat liquid		Aquadest
				KOH	Aquadest	Asam Sitrat	Aquadest	
Making Soap Base	25	20	40	15	20	-	-	-
Making Soap Liquid	-	-	-	-	-	5	40	200

The ingredients used in making body scrubs are ground coffee grounds, aloe vera, antimicrobial liquid soap, and cornstarch. The composition of raw materials can be seen in Table 2.

Table 2. Composition for Making Body Scrub

Raw Materials Formulation	Variables Constant		Variables Change	
	Liquid Soap (g)	Cornstarch (g)	Aloe Vera (g)	Coffee Grounds (g)
Variant 1 (V1)	37	3	20	40
Variant 2 (V2)	37	3	30	30
Variant 3 (V3)	37	3	40	20

2. Making Liquid Soap

3. Used cooking oil, olive and castor oil are mixed and heated to a temperature of 70oC and maintained at that temperature. In a separate place, KOH is dissolved in distilled water and added to the oil mixture, then stirred until the lumps are solid. The solid lump is called soap base (Bakhri, et al., 2024).

The soap base is heated for 3 hours, stirring every 30 minutes, then boiled distilled water is added and citric acid solution is added to neutralize it. The result of this process is called liquid soap. This liquid soap is stored for 2 weeks so that it is clear and transparent.

4. Making Body Scrub

Liquid soap is heated to a temperature of 70oC, mixed with aloe vera gel and stirred until smooth, then added cornstarch and coffee grounds, and stirred until everything is evenly mixed. This result is called a body scrub.

5. Liquid Soap Testing Procedure for the Zone of Bacterial Inhibition

Liquid soap was tested for its inhibitory zone using Propionibacterium acne bacteria.

5.1. Test Media Preparation

The base layer is made by pouring 10 ml of nutrient agar from the base medium into 3 petri dishes, then leaving it until it solidifies (Base Layer). After solidifying, on the surface of the base layer, 3 steel backers are placed which are arranged at such a distance so that the observation areas do not overlap each other. Then, the bacterial suspension is mixed into the

Syamsul Bakhri et al, Organoleptic, Moisture and Irritation Tests on Scrubs Based on Coffee Grounds, Aloe Vera, and Liquid Soap Based on Used Cooking Oil, Olive, and Castor.

Nutrient agar seeding medium. After that, 10 ml of the *Propionibacterium acne* suspension mixture and the seeding medium were poured into each petri dish which was placed as a second layer (Side Layer). Next, the reservoir is aseptically removed from the petri dish, so that finally the wells are formed which will be used in the antibacterial activity test (Bakhri, et al., 2023).

5.2. Antibacterial Activity Test

Testing is carried out in Vitro. The liquid soap test solution as a negative control, each was added to a different well of nutrient agar as much as 200 μ L (micro liter) or 0.2 ml. Then the petri dish was incubated in an incubator at 37°C for 1x24 hours (Bakhri, et al., 2023).

5.3. Observation and Measurement

Observations were made after 1x24 hours of incubation period. The clear area is an indication of the sensitivity of the bacteria to the antibacterial agent used as the test material, which is expressed by the width of the diameter of the inhibition zone. The diameter of the inhibition zone is measured in millimeters (mm) using a scale rule by means of the overall diameter minus the hole diameter of 7 mm. Then the diameter of the inhibition zone was categorized for its antibacterial strength based on the *Davis* and *Stout* classification (Bakhri, et al., 2023).

6. Body Scrub Organoleptic Testing

This test was carried out descriptively for 2 weeks, with test parameters in accordance with SNI 01-2346-2006, namely respondents' preferences for the aroma and texture parameters of the body scrub produced in this study. The aroma and texture parameters preferred by respondents are coffee aroma and smooth texture. The number of respondents who were willing and had written a statement of willingness was 13 peoples.

7. Humidity and Irritation Level Testing

This test uses analytical observation and questionnaire methods, where the body scrub is applied to the forearm, then rinsed and left for 30 minutes to observe changes that occur in the skin after use. If a reaction or change occurs, it is marked (+), and if no reaction or change occurs, it is marked (-)

The objects observed after use are itching (G), redness (Km), edema (E), and moisture (Kb). There were 13 willing respondents, whose identities were students of the Chemical Engineering Study Program, Faculty of Industrial Technology, Indonesian Muslim University.

RESULTS AND DISCUSSION

1. Result of Making Liquid Soap

Liquid soap produced from raw materials with the composition: 25 g used cooking oil, 20 g olive oil, 40 g castor oil, 15 g KOH and 20 g water, can be seen in Figure 1.



Figure 1. Produced Liquid Soap

2. Results of Bacterial Inhibition Zone Testing in Liquid Soap

The appearance and results of the inhibitory zone activity test against *Propionibacterium acne* (PAC) bacterial contamination in liquid soap formulas 1 and 2 can be seen in Figure 2 and Table 4.

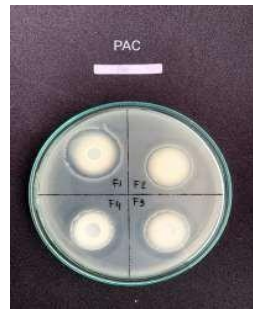


Figure 3. Results of the Zone of Inhibition of Propionibacterium acne Bacterial Contamination in Liquid Soap

Table 3. Data from Testing Results of Propionibacterium acne (PAC) Bacterial Inhibition Zone.

Research Object	R1 (mm)	R2 (mm)	R3 (mm)	Mean (mm)
Liquid Soap	23,70	23,72	23,90	23,77

Information
R = Repetition

The strength of antibacterial power is categorized based on the diameter of the inhibition zone formed, namely an inhibition zone diameter of 5 mm or less is categorized as weak, an inhibition zone of 5-10 mm is categorized as moderate, an inhibition zone of 10-20 mm is categorized as strong and an inhibition zone of 20 mm or more (≥ 20 mm) is categorized as very strong (Bakhri, 2021). Data on the diameter of the zone of inhibition of Propionibacterium acne bacterial contamination in liquid soap is included in very strong criteria, because it has an average value of the diameter of the zone of inhibition of 23.77 mm. Liquid soap has a value greater than 20 mm (> 20 mm) according to SNI standard number 06-4085-1996. The higher the bacterial inhibition zone, the better it is used on the skin because it can kill and inhibit bacteria on the skin, as according to (Oktiana, 2021) that the higher the inhibitory zone, the better it will be at inhibiting bacteria on the skin.

3. Results of Body Scrub Organoleptic Test

The results of organoleptic testing were carried out by looking at the texture, aroma and color of the body scrub preparation where this test was carried out for 2 weeks, can be seen in Figure 3 and Table 4.



Figure 3. Variations of Body Scrub Produced

Table 4. Results of Body Scrub Organoleptic Tests

No.	Research Variables	Body Scrub Formulation		
		V1	V2	V3
1.	Texture	Fine	Fine	Very Smooth
2.	Aroma	Special Coffee	Special Coffee	Special Aloe vera
3.	Color	Black	Black	Black

Keterangan
V1 = 1, Body Scrub Variation
V2 = 2, Body Scrub Variation
V3 = 3, Body Scrub Variation

Syamsul Bakhri et al, Organoleptic, Moisture and Irritation Tests on Scrubs Based on Coffee Grounds, Aloe Vera, and Liquid Soap Based on Used Cooking Oil, Olive, and Castor.

Based on the test results above, the aroma produced by all variations 1 and 2 of the body scrub preparations is dominantly typical of coffee because the antioxidants in coffee are able to neutralize the aroma of the body scrub preparations, but variation 3 has the aroma of aloe vera because the content of aloe vera is more than coffee grounds. , and coffee grounds are not able to neutralize the aroma of body scrub preparations. The resulting texture is predominantly smooth. The resulting color is black. The results of this organoleptic test show that the best variant is variant 3, because it has the aroma of aloe vera, is black in color and has a very fine texture.

4. Humidity and Irritation Level Test Results.

The results of the humidity test and level of irritation can be seen in Table 5. The level of irritation is indicated by redness, itching and swelling.

Table 5. Table of moisture and irritation test results for Variations 1, 2, and 3.

Panelists	Body Scrub Variatiom											
	V1				V2				V3			
	I	R	E	H	I	R	E	H	I	R	E	H
1	-	-	-	-	-	-	-	+	-	-	-	+
2	-	-	-	-	-	-	-	+	-	-	-	+
3	-	-	-	-	-	-	-	+	-	-	-	+
4	-	-	-	+	-	-	-	+	-	-	-	+
5	-	-	-	+	-	-	-	+	-	-	-	+
6	-	-	-	+	-	-	-	+	-	-	-	+
7	-	-	-	+	-	-	-	+	-	-	-	+
8	-	-	-	+	-	-	-	+	-	-	-	+
9	-	-	-	+	-	-	-	+	-	-	-	+
10	-	-	-	+	-	-	-	+	-	-	-	+
11	-	-	-	+	-	-	-	+	-	-	-	+
12	-	-	-	+	-	-	-	+	-	-	-	+
13	-	-	-	+	-	-	-	+	-	-	-	+

Keterangan :
 I = Itchy, R = Redness, E = Ederma, H = Humidity
 (+) = Terjadi Reaksi (-) = Tidak Terjadi Reaksi

Based on the test results above, it shows that all body scrub variants do not experience itching, redness and edema. Apart from that, in variants 2 and 3 there is a moisture reaction on the skin, while in variant 1 there is dominant moisture on the skin, this is because more coffee grounds are used compared to variants 2 and 3. This result can be stated that the body scrub preparations of variants 1, 2 and 3 is safe to use because it does not cause itching, redness and edema, and can moisturize the skin so that the body scrub preparation is suitable for use on the skin.

CONCLUTION

In this research, antimicrobial liquid soap, coffee grounds and aloe vera are the basic ingredients for making a body scrub that has good moisture and does not cause irritation to the skin.

REFERENCES

- Bakhri, S., Suryanto, A., Zainal, Z. & Fidya, N., 2024. Saponification Process Of Coconut Oil And Banana Peel Extract for The Production of Antibacterial Liquid Soap And Wound Healing. *Jurnal Teknologi Dan Industri Pertanian Indonesia*, 16(1), pp. 1-7.
- Hairyan, N. & Nuryati, N., 2020. Aplikasi Beras Ketan Hitam (*Oryza sativa* var glutinous) dan Madu Sebagai Bahan Dasar Pembuat Bodyscrub?. *Jurnal Teknologi Pertanian Andalas*, 24(2), pp. 114- 121.
- Puspitasari, D. F. et al., 2020. Pemanfaatan Ampas Kopi (*Coffea* sp) Sebagai Sediaan Body Scrub di Desa Tempur Jepara Utilization of Coffee Dregs (*Coffea* sp) as Body Scrub Preparations in Tempur Village , Jepara. *Jurnal DiMas*, 2(1), p. 76–82.
- Bakhri, S., Rasyid, R., L. & Lestari, T. I. W., 2023. Pengaruh Penambahan Minyak Zaitun Dan Minyak Jarak Pada Pembuatan Hand Soap Berbasis Minyak Jelantah Dengan Proses Saponifikasi. *Jurnal Industri dan Hasil Perkebunan (JIHP)* , 18(2), pp. 16-23.

Syamsul Bakhri et al, Organoleptic, Moisture and Irritation Tests on Scrubs Based on Coffee Grounds, Aloe Vera, and Liquid Soap Based on Used Cooking Oil, Olive, and Castor.

5. Bakhri, S. et al., 2023. Pembuatan Handsoap Berbasis Minyak Jelantah dan Minyak Zaitun Dengan Proses Saponifikasi Untuk Melembapkan Kulit, Menghambat Pertumbuhan Mikroba, Dan Halal Digunakan. *Jurnal Teknologi Pangan Dan Hasil Penelitian (JTPHP) Universitas Semarang*, 18(1), pp. 10-18.
6. Hariyah, N., Nuryati, N. & Nordiyah, F., 2022. Formulasi Pembuatan Bodyscrub Berbahan Dasar Beras Ketan Putih (*Oryza sativa* var glutinous) dan Madu,. *Jurnal Teknologi Pertanian Andalas*, 26(1), pp. 53-69.
7. Bakhri, S. A. Z. N. U. Y. A. N., 2021. Proses Saponifikasi Minyak Jelantah dan Sisik Ikan untuk Produksi Sabun Cair Penghilang Luka. *Jurnal Sosial Teknologi SOSTECH*, 9(1), pp. 1121-1130.
8. Oktiana, F. e. a., 2021. Uji Aktivitas Antibakteri Sabun Mandi Cair Terhadap *Escherichia coli*. *Prosiding SEMNAS BIO 2021*, 1, p. 329–334.