

**FORMULATION AND PHYSICAL STABILITY TESTING OF CREAM
SCRUB PREPARATIONS FROM ETHANOL EXTRACT OF
Nelumbo nucifera GAERTN FLOWER AND LEAF**

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ABSTRAK

Nelumbo nucifera merupakan tumbuhan air yang tumbuh di tanah berlumpur dan tergenang air seperti di rawa. *Nelumbo nucifera* juga digunakan dalam pengobatan tradisional seperti pengobatan diare, inflamasi jaringan dan homeostatis. Bunga dan daun *Nelumbo nucifera* mengandung senyawa metabolit sekunder seperti flavonoid, alkaloid, tanin, dan kandungan antioksidan. Penelitian ini untuk mengetahui ekstrak etanol bunga dan daun *Nelumbo nucifera* dapat diformulasikan sebagai lulur krim dan konsentrasi 3% , 5% dan 7% mampu melembabkan pada kulit. Metode penelitian ini adalah eksperimental yang meliputi pembuatan simplisia, pembuatan ekstrak, pembuatan sediaan lulur dari ekstrak etanol bunga dan daun *Nelumbo nucifera* dan evaluasi sediaan lulur. penelitian ini memperoleh persentase peningkatan kelembaban krim ekstrak etanol bunga *Nelumbo nucifera* pada F1 sebesar 41,2%, F2 sebesar 46,5%, F3 sebesar 52,9%. Hasil persentase peningkatan kelembaban krim ekstrak daun *Nelumbo nucifera* diperoleh F1 sebesar 38,8%, F2 sebesar 44,4% dan F3 sebesar 47,7%. Ekstrak etanol bunga dan daun *Nelumbo*

nucifera dapat diformulasikan sebagai sediaan lulur krim. Lulur krim dari ekstrak bunga dan daun *Nelumbo nucifera* dengan konsentrasi 3% 5% dan 7% dapat memberikan efek melembabkan pada kulit.

Kata kunci: Lulur Krim, Bunga, Daun, *Nelumbo nucifera*

ABSTRACT

Nelumbo nucifera is an aquatic plant that thrives in muddy and soggy soil, particularly in swampy environments. *Nelumbo nucifera* is utilized in traditional medicine for various purposes, including the management of diarrhea, tissue inflammation, and homeostasis. The flowers and leaves of *Nelumbo nucifera* contain many secondary metabolite chemicals, including flavonoids, alkaloids, tannins, and antioxidants. The objective of this study is to ascertain the feasibility of formulating a cream scrub using the ethanol extract of *Nelumbo nucifera* flowers and leaves. Additionally, the study attempts to discover if concentrations of 3%, 5%, and 7% of this extract can effectively moisturize the skin. This research technique is based on experimentation, involving the creation of simplicial, the production of extracts, the formulation of body scrub preparations using ethanol extracts of *Nelumbo nucifera* flowers and leaves, and the subsequent evaluation of these body scrub preparations. This study found that the moisture content of *Nelumbo nucifera* flower ethanol extract cream increased by 41.2% in F1, 46.5% in F2, and 52.9% in F3. The humidity percentage values for *Nelumbo nucifera* leaf extract cream were obtained as follows: F1 at 38.8%, F2 at 44.4%, and F3 at 47.7%. The ethanol extract derived from the flowers and leaves of *Nelumbo nucifera* can be prepared and used as a cream scrub. A cream scrub containing *Nelumbo nucifera* flower and leaf extract at concentrations of 3%, 5%, and 7% can effectively moisturize the skin.

Keyword: Cream Scrub, Flower, Leaf, *Nelumbo nucifera*.

INTRODUCTION

Skin is an organism's outer surface and separates it from the outside world. The skin protects tissue against chemical, physical, and mechanical harm and pathogens [1]. Aging occurs with age. Many internal and external variables affect aging. Sunlight and other external factors can damage the skin. Skin conditions can be treated. Skincare can be internal or exterior [2]. Modern skin care uses chemicals and sophisticated technological tools or machines, while traditional care uses natural ingredients

processed manually, such as fruit-based body scrubs, Cosmetics are products used on the skin, hair, nails, and external sexual organs, as well as the teeth and oral mucosa, to clean, perfume, change appearance, enhance body odour, and maintain health. Body scrubs are cosmetics that cleanse the body [3,4].

Body scrubs, created from flowers and other plants, help keep skin healthy, smooth, and bright. Scrubs can remove weather- and pollution-induced grime from the skin, making it healthy, clean, and beautiful [5]

There are two kinds of scrubs: standard scrubs and modern scrubs. Body scrubs from the past were made with rough ingredients like spices and flour. In the meantime, modern body scrubs are made from scrub granules and lotion, which is generally made from milk. Scrubs come in powder, cream, and whipped forms. It is common for cream scrubs to be formed like a paste or thick dough. They can be used directly on damp skin or skin that has been wet first. The powdered body scrub must first be melted until it forms a paste that is neither too liquid nor too thick. It can then be applied to the body while it is still dry [6];[8].

Indonesia has a lot of natural resources that are good for people, like plants that are full of natural wealth. It turns out that a lot of plants can be used for beauty and health, *Nelumbo nucifera*, which is also called *Nelumbo nucifera* or holy *Nelumbo nucifera*, is an aquatic annual plant in the Nelumbonaceae family. A plant that comes from India and is a sign of that country is the *Nelumbo nucifera*. This plant can be used to treat a number of illnesses. Most people around the world, in both rural and urban places, depend on plants to treat infectious diseases [9];[10].

Nelumbo nucifera Gaertn has been used for a long time to treat a wide range of illnesses because it has many healthy substances, including protein, fat, carbohydrates, carotene, starch, phosphorus, iron, calcium, and more. It also has active compounds like antioxidants and polyphenols. Vitamin C is also good for killing germs. Based on what Romadanu et al. found in their study. The phytochemical screening of *Nelumbo nucifera* flower extract shows that it contains flavonoid and alkaloid chemicals [11].

According to a study by Fitri et al. 2023, the water content of *Nelumbo nucifera* leaf was 4.51 percent, the water-soluble essence content was 10.35 percent, the ethanol-soluble content was 11.58 percent, and the total ash content was 6.85 percent [12].

Previous study used basil leaf extract (*Ocimum sanctum* L.) and white rice (*Oryza sativa* L.) to make body scrub cream. They used 3 different formulas with different concentrations, namely 3%, 5%, and 7% [13].

The goal of this study is to find out if the flowers and leaves of *Nelumbo nucifera* Gaertn can be turned into a cream scrub using an ethanol extract. To find out if scrub cream made from 3%, 5%, and 7% ethanol extract of *Nelumbo nucifera* flowers and leaves can keep the skin wet.

RESEARCH METHOD

This research is experimental. This research collects volunteers, measures their skin, makes extracts, and makes body scrubs from *Nelumbo nucifera* flower and leaf ethanol extracts. The period was July–September 2022. This study was done at Helvetia Health Institute Cosmetology

Laboratory. This study focused on *Nelumbo nucifera* plants without comparisons. The sample used was the *Nelumbo nucifera* Gaertn plant obtained from Marelan District, Medan City, North Sumatra.

MATERIALS

Blenders, sieves, moisture probes, porcelain cups, stir sticks, mortar and pestle, beakers, measuring cups, dropper pipettes, parchment paper, rotary evaporator, pH meter, filter paper, spoons, spatulas, and digital scales are Stearic acid, sorbitol, cetyl alcohol, propylene glycol, triethanolamine, methylparaben, distilled water, polyethylene scrub, scent, and *Nelumbo nucifera* flower and leaf ethanol extract were utilized in this study.

Preparing *Nelumbo nucifera* Leaf and Flower Extract

The simplicia powder extract of *Nelumbo nucifera* leaves and flowers was macerated at 1:10, 600 grams of material to 6000 ml of solvent. The extract-making process is: Put 600 grams of simplicial powder in a jar. Soaked in 4500 cc of 70% ethanol

solvent. The container was covered with aluminium foil and left for 5 days, stirring occasionally, then filtered using filter paper to yield a filtrate and residue. Remaceration with 25 parts of the remaining 1500 ml of 70% ethanol is then performed on the residue. After covering the container with aluminium foil, stir every two hours for two days. After 2 days, the sample was filtered for residue and filtrate. Mix filtrate 1 and filtrate 2, then evaporate the 70% ethanol liquid extract with a rotary evaporator until thick [14].

Modified Formula for *Nelumbo nucifera* Flower Ethanol Extract Cream Scrub

Cream scrubs containing *Nelumbo nucifera* flower extract at F1 3%, F2 5%, and F3 7%. Blank F0 cream scrub was created without extract.

Table 1. Modified Formula for *Nelumbo nucifera* Flower Ethanol Extract Cream Scrub

Material	Efficacy	Cream Scrub Formula			
		F0	F1	F2	F3
Ethanol Extract <i>Nelumbo nucifera</i> Flower	Efficacious substances	-	3	5	7
TEA	Emulgator	1	1	1	1
Cetyl Alcohol	Emulsifiers	0,5	0,5	0,5	0,5
Propylene Glycol	Moisturizer	3	3	3	3
Methyl Paraben	Pengawet	0.2	0.2	0.2	0.2
Sorbitol	Humectants	5	5	5	5
Stearic Acid	Emulsifiers	12	12	12	12
Green tea perfume	Fragrance	3 drops	3 drops	3 drops	3 drops
Polyethylene scrub	Exfoliant	2	2	2	2
Aquadest	Solvent	ad 100 ml	ad 100 ml	ad 100 ml	ad 100 ml

Information:

- F0 : without ethanol extract of *Nelumbo nucifera* flower
- F1 : *Nelumbo nucifera* flower ethanol extract concentration 3%
- F2 : *Nelumbo nucifera* flower ethanol extract concentration 5%
- F3 : *Nelumbo nucifera* flower ethanol extract concentration 7%

Modified Formula of *Nelumbo nucifera* Leaf Ethanol Extract Cream Scrub Preparation

Nelumbo nucifera leaf extract was used in the cream scrub

preparations with variations in concentration F1 3%, F2 5%, and F3 7%. The basic formulation of cream scrub without extract was made as a blank F0.

Table 2. Modified Formula for *Nelumbo nucifera* Leaf Ethanol Extract Cream Scrub

Material	Efficacy	Cream Scrub Formula			
		F0	F1	F2	F3
Ethanol Extract <i>Nelumbo nucifera</i> Leaf	Efficacious substances	-	3	5	7
TEA	Emulgator	1	1	1	1
Cetyl Alcohol	Emulsifiers	0,5	0,5	0,5	0,5
Propylene Glycol	Moisturizer	2	2	2	2
Methyl Paraben	Pengawet	0.2	0.2	0.2	0.2
Sorbitol	Humectants	5	5	5	5
Stearic Acid	Emulsifiers	12	12	12	12
Green tea perfume	Fragrance	3 drops	3 drops	3 drops	3 drops
Polyethylene scrub	Exfoliant	2	2	2	2
Aquadest	Solvent	ad 100 ml	ad 100 ml	ad 100 ml	ad 100 ml

Information:

- F0 : without ethanol extract of *Nelumbo nucifera* leaf
- F1 : *Nelumbo nucifera* leaf ethanol extract concentration 3%
- F2 : *Nelumbo nucifera* leaf ethanol extract concentration 5%
- F3 : *Nelumbo nucifera* leaf ethanol extract concentration 7%

Scrub Making Method

Gather tools and materials. Weigh each component. Wipe mortar and pestle dry after heating. Put stearic acid and cetyl alcohol in a vaporizer cup and melt on a water bath (mass I). Sorbitol, propylene glycol, triethanolamine, and methyl paraben were dissolved in hot water (massII). Add mass I too hot, dried mortar.

Constantly crushing slowly added mass II produced a homogenous scrub mass. Add flower extract or *Nelumbo nucifera* leaves to the scrub at the prescribed concentration, crush again, and add 3 drops of scent until homogenous. Add polyethylene, homogenize. Assess scrub preparation.

Evaluation of Scrub Preparation

Organoleptic Test

Organoleptic observations made on the preparation of cream scrubs include observations of changes in color, texture, and odor using the human senses as the primary tool for measuring the acceptance of preparations that have been made [15].

Test Homogeneity

Homogenous arrangement without coarse grains should result from applying a particular amount of the preparation to glass or other transparent material. This test determines if parts require better mixing [16].

pH Test

pH meters were used for the test. In a beaker, 1 gram of the substance is diluted in 100 ml of distilled water. The pH meter shows the number until constant on the left. The pH meter shows the preparation's pH. Three copies were tested for each formula. The cream scrub's pH must match the skin's 4.5-6.5 [17].

Spreadability Test

The spreadability test ensures the preparation is evenly dispersed on

the culture. The spreadability criteria for topicals is 5-7 cm. After placing 1 g in the middle of a round glass covered with another, 50 g was added and left for one minute, and the spreadability diameter was measured. After adding 100 g and waiting one minute, the spreadability diameter was measured. After adding 150 g and waiting one minute, assess spreadability diameter. I finished until enough diameter was produced to see how the load affected preparation spreadability [18].

Irritation Test

The irritation test was carried out by applying the cream scrub preparation behind the ear to 12 volunteers and then observing for 15 minutes the symptoms that occurred. The reaction observed is the occurrence of irritation on the skin or not [19].

Moisture Test

The effectiveness test was conducted on 15 volunteers and divided into five groups, namely:

1. Group I: 3 volunteers for the blank formula
2. Group II: 3 volunteers for 3% formula

3. Group III: 3 volunteers for 5% formula
4. Group IV: 3 volunteers for 7% formula
5. Group V: 3 volunteers for the positive control of purbasari body scrub

Volunteers who have been grouped are measured for moisture content using a moisture checker on their skin first, then given a cream scrub preparation from ethanol extracts of seroma *Nelumbo nucifera* and leaves on the marked volunteer's hand skin area. The skin condition was checked before and after using the scrub [20].

Stability Test (Cycling Test)

The stability test was conducted using the cycling test method. The cream scrub samples were stored at 4°C for 24 hours and then transferred to a 40° oven for 24 hours (one cycle). The test was conducted for six cycles, and the

physical changes, including organoleptics, homogeneity, and pH, were observed [21].

Hedonic Test

The hedonic test is carried out on aroma, physical appearance, texture, and comfort when using the preparation; the hedonic test is also called the test of a person's preference or preference for a product.

RESULTS AND DISCUSSION

Evaluation of Cream Scrub Preparation Organoleptical Test

Tables 1 and Table 2; organoleptic tests of cream scrub preparations from ethanol extracts of seroma flowers and *Nelumbo nucifera* leaves were performed on three concentrations with blanks to determine shape, colour, and fragrance.

Tabel 3. Organoleptic Test of *Nelumbo nucifera* Flowers

No	Formulation	Form	Colour	Odor
1	F0	Cream	White	Green tea
2	F1	Cream	Beige	Green tea
3	F2	Cream	Light brown	Green tea
4	F3	Cream	Chocolate	Green tea
5	F4	Cream	White	Green tea

Table 4. Organoleptic Test of *Nelumbo nucifera* Flowers

No	Formulation	Form	Colour	Odor
1	F0	Cream	White	Green tea
2	F1	Cream	Light brown	Green tea
3	F2	Cream	Chocolate	Green tea
4	F3	Cream	Dark brown	Green tea
5	F4	Cream	White	Green tea

Ethanol extract *Nelumbo nucifera* cream scrub organoleptic outcomes F1 (cream), F2 (light brown), and F3 (brown and cream) smell like green tea. *Nelumbo nucifera* leaf ethanol extract cream scrub F1, F2, and F3 are light brown, brown, and dark brown, cream-shaped, and smell like green tea.

Nelumbo nucifera flower and leaf extracts at different concentrations in each formula and in F3, which has 7% ethanol extract, produce a brown and dark brown color because the higher the concentration, the more intense the color. Research on cream scrubs by researcher on red guava leaf extract at 4%, 6%, and 8% showed a stronger and more intense color at 8% [22].

Test Homogeneity

Nelumbo nucifera flower ethanol extract cream scrub

formulations produce well-mixed components due to their homogeneity. If the glass has foreign particles and lumps, all cream scrubs are homogeneous.

The homogeneity test on cream scrubs made from ethanol extracts of *Nelumbo nucifera* flowers and leaves shows that the preparations are homogeneous by not having poorly mixed parts. This is supported by research on rice husk activated charcoal with concentrations of 8%, 10%, and 12%. Susanna, no parts are unmixed when tested on glass [23].

Test pH

The pH test results for the ethanol extract cream scrub from *Nelumbo nucifera* flowers and leaves carried out using a pH meter can be seen in Table 5 and Table 6.

Table 5. pH test of *Nelumbo nucifera* Flower Ethanol Extract Cream Scrub

Formulation	pH 1	pH 2	pH 3	Average
F0	6,7	6,7	6,8	6,7
F1	6,6	6,8	6,7	6,7
F2	6,6	6,5	6,5	6,5
F3	6,4	6,4	6,6	6,5
F4	6,5	6,4	6,4	6,4

Tabel 4. pH test of *Nelumbo nucifera* Leaf Ethanol Extract Cream Scrub

Formulation	pH 1	pH 2	pH 3	Average
F0	6,8	6,8	6,9	6,8
F1	6,6	6,7	6,7	6,7
F2	6,5	6,4	6,3	6,4
F3	6,2	6,3	6,4	6,3
F4	6,5	6,4	6,4	6,4

Nelumbo nucifera flower ethanol extract cream scrub pH measurements showed that the blank, F1, F2, F3, and F4 (positive control) had pH values of 6.7, 6.5, 6.5, and 6.4, respectively. The pH test on *Nelumbo nucifera* leaf ethanol extract cream scrub showed that the blank has a pH of 6.8, F1 has 6.7, F2 has 6.4, F3 has 6.3, and F4 (positive control) has 6.4.

The pH of the preparation was lower than the blank preparation, which is safe for facial skin, as the concentration of ethanol extracts of *Nelumbo nucifera* flower and leaves increased. The acidity of *Nelumbo nucifera* flower and leaf extracts may affect this. CO₂ entering the container during measurements reacts with water to lower pH. The cream scrub of ethanol

extracts of *Nelumbo nucifera* flowers and leaves has a pH of F2 and F3, similar to the skin. According to Sopianti et al. (2022) research on cream scrubs using red seaweed extract at 5%, 10%, and 15% concentrations, the more extract added to the preparation, the more acidic the pH value and the pH decreases [24].

Scatterability Test

The spreadability test of the cream scrub preparation of ethanol extract of *Nelumbo nucifera* flowers showed an average of 5.6 cm on F0, 5.5 cm on F1, 5.4 cm on F2, 5.3 cm on F3, and 5.1 cm on F4. *Nelumbo nucifera* spreadability test findings on F0 average 5.6 cm, F1 is 5.6 cm, F2 is 5.4 cm, F3 is 5.3 cm, and F4 is 5.1 cm.

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According to the spreadability test results of the cream scrub of ethanol extract of seroma flower, F0 had 5.6 cm spreadability, F1 5.5 cm, F2 5.4 cm, F3 5.3 cm, and F4 (positive control) 5.1 cm. The cream scrub of *Nelumbo nucifera* leaf ethanol extract had an average spreadability of 5.6 cm at F0, 5.6 cm at F1, 5.4 cm at F2, 5.3 cm at F3, and 5.1 cm at F4 (positive control).

The spreadability of the cream scrub of ethanol extracts of *Nelumbo nucifera* flowers and leaves decreased with increasing extract concentration because the thicker the concentration, the lower the spreadability. The results demonstrate that all dosage formulations of *Nelumbo nucifera* flower and leaf ethanol extracts meet topical spreadability requirements of 5-7 cm [25].

Irritament Test

In the irritant test on volunteers, *Nelumbo nucifera* flower ethanol extract cream scrub did not cause redness, itching, or skin swelling. Thus, blank cream scrubs with 3%, 5%, and 7% *Nelumbo nucifera* flower ethanol extract do not irritate. The *Nelumbo nucifera* flower ethanol extract cream scrub is safe in its entirety [26].

All 12 volunteers did not induce skin redness, itching, or swelling in the irritation test. *Nelumbo nucifera* flower and leaf ethanol scrub creams tested negative and were safe to use.

Moisture Test

Moisture measurement results showing the percentage increase in skin moisture before week 1 and week 4 after use.

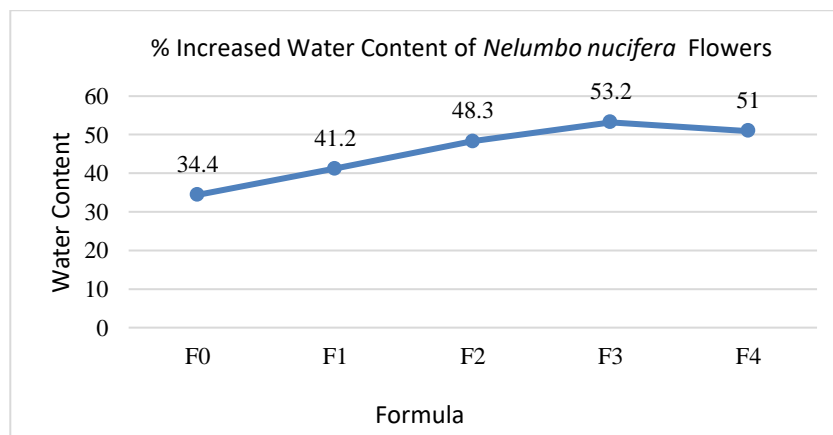


Figure 1. Moisture Test of *Nelumbo nucifera* Flower Ethanol Extract Cream Scrub

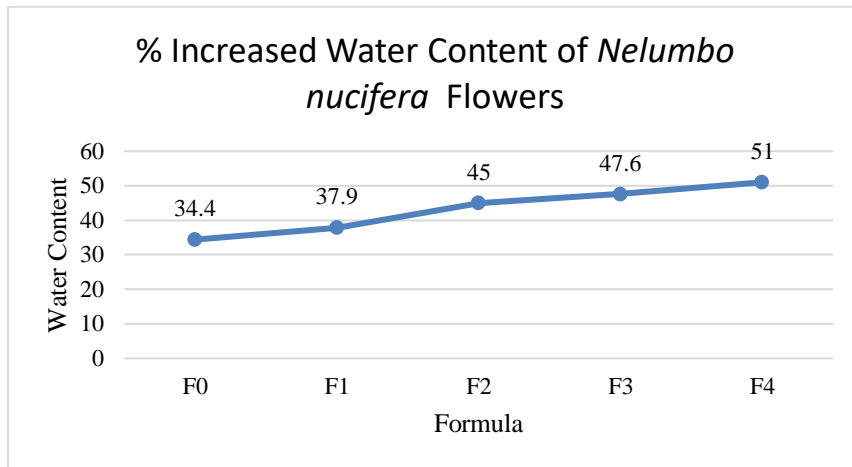


Figure 2. Moisture Test of *Nelumbo nucifera* Leaf Ethanol Extract Cream Scrub

Each *Nelumbo nucifera* flower ethanol extract cream scrub formulation increased skin hydration by varied percentages in participants. *Nelumbo nucifera* flower ethanol extract cream scrub preparation increases 34.4% in F0, 41.2% in F1, 48.3% in F2, 53.2% in F3, and 51% in F4 (positive control). The results show that skin water content increases using *Nelumbo nucifera* flower ethanol extract. With more ethanol extract in grains, skin can resist water evaporation.

Each *Nelumbo nucifera* leaf ethanol extract cream scrub recipe

increased skin hydration by varied percentages in participants. The *Nelumbo nucifera* leaf ethanol extract cream scrub preparation increased 34.4% in F0, 37.9% in F1, 45% in F2, 47.6% in F3, and 51% in F4 (positive control). The results show that skin water content increases with *Nelumbo nucifera* leaf ethanol extract. This suggests that skin evaporation resistance increases with seroma leaf ethanol extract content [27].

CONCLUSION

The ethanol extract of *Nelumbo nucifera* flowers and *Nelumbo nucifera* leaves can be formulated as a cream scrub. Cream scrub from *Nelumbo nucifera* flower and leaf extract (*Nelumbo nucifera* with concentrations of 3%, 5% and 7% can moisturize the skin.

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