Journal of
Patchouli and Essential Oil Products

JPEOP

Vol. 1, No.1, Page 22- 25, June 2022

Evaluation of Physical Quality of Patchouli Oil (Pogostemon cablin Benth.) Body Butter Formulation

Nadia Isnaini[1,2], Khairan Khairan[2,3,4*], Meutia Faradhilla[2,3], Elly Sufriadi[2,5], Binawati Ginting[2,5], Vicky Prajaputra[6], Friesca Erwan[2,7], Raihan Dara Lufika[2,7], Syaifullah Muhammad[2,8]

[1]Pharmacy Department, Universitas Indonesia, Depok, Indonesia, 16424
[2]PUIPT-Nilam Aceh-Atsiri Research Centre, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
[3]Department of Pharmacy, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
[4]Herbal Medicine Research Centre, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
[5]Department of Chemistry, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
[6]Chemistry Department, Institut Pertanian Bogor, Bogor, Indonesia, 16680
[7]Department of Industrial Engineering, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
[8]Department of Chemical Engineering, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111
*** Corresponding author email address**: khairankhairan@unsyiah.ac.id

Received : 10 October 2021; Accepted : 8 December 2021; Published online : 29 April 2022

Abstract

Patchouli oil (Pogostemon cablin Benth.) has antioxidant and antibacterial activities that can be used as an active ingredient in cosmetic products, such as body butter. Body butter preparations have the highest oil content. Therefore, they usually have the shortest storage period because they can easily damage during the storage period. The study aimed to evaluate the physical quality of patchouli oil body butter formulation in an accelerated stability test process for seven cycles. The formula was tested for its physical stability by organoleptic test, homogeneity, pH, absorption, adhesion, and dispersibility. Preparation evaluation was carried out in each cycle and analyzed using Student's t-test. The evaluation result of body butter preparation showed no significant difference ($p > 0.05$) in the preparation in each cycle. Therefore, it can be concluded that the body butter formulation of patchouli oil was stable during the storage period for ± six months.

Keywords: patchouli oil, body butter, physical stability

1. INTRODUCTION

Patchouli (Pogostemon cablin Benth.) is an Indonesian national superior commodity capable of producing high essential oil concentrations. Patchouli oil is the essential oil of the patchouli plant. This oil is widely used in the cosmetics industry, including the production of perfumes, soaps, and other topical pharmaceutical preparations. Patchouli alcohol, patchouli camphor, cadinen, benzaldehyde, eugenol, and cinnamic aldehyde are all found in patchouli oil. In the global cosmetics industry, patchouli alcohol (abbreviated PA) is a compound of concern. Patchouli oil with 30 percent PA is considered to be good. Patchouli oil is typically used as a fixative (binding agent), active antibacterial ingredient (Ervianingsih et al. 2019), and antioxidant (Shabrina et al. 2020).

Body butter is a semisolid topical cosmetic preparation with the highest proportion of oil, making it very thick and butter-like in consistency. Body butter typically contains more oil components (shea butter, cocoa butter, and coconut butter) than lotion, making it more nourishing to the skin. Patchouli oil can be used to replace the oil components commonly found in body butter, providing additional antioxidant and antibacterial benefits. The goal of this study was to see if the patchouli oil body butter preparation was physically stable.

2. MATERIALS AND METHODS

2.1. Instruments and Ingredients

The instruments used are rotary vacuum evaporator, analytical balance, hot plate, mixer, object-glass, thermometer, beaker, and stirring rod. The ingredients used are patchouli oil, universal pH indicator, cetyl alcohol, steric acid, lanolin, glycerin, triethanolamine, aquades, butylated hydroxytoluene (BHT), dyes, and fragrances.

2.2. Patchouli Oil Body Butter Production

The patchouli oil body butter is made by weighing all of the necessary ingredients; the oil phase (cetyl alcohol, stearic acid, lanolin, patchouli oil) is then placed in a beaker glass and heated to 70oC until melted. The aqueous phase (triethanolamine, glycerin,

distilled water) was put in another glass beaker and heated to 50oC. The liquid phase is poured into the melted oil phase after reaching a temperature of 50oC, and the two phases are homogenized with a mixer until they reach room temperature (30 ± 2oC). Add BHT, dye, and fragrance, then stir until homogeneous.

2.3. Evaluation of the Physical Quality of Patchouli Oil Body Butter

An accelerated stability test was used to determine the physical quality of the physical preparation of body butter. The body butter formulation was first incubated at 4 ± 2oC for 24 hours before moving to 40 ± 2oC for another 24 hours. This process is counted as one cycle and is repeated until the seventh cycle is reached (Sabrina 2017). Changes in organoleptic, homogeneity, pH, absorption, dispersion, and adhesion were observed in each cycle.

2.4. Organoleptic Test

The form, color, and odor of the preparation were observed. It is done to determine which body butter is made according to the color and smell of the oil used (Dewi et al. 2016).

2.5. Homogeneity Test

One gram of patchouli oil body butter on the top, middle, and the bottom is taken, then smeared on a piece of transparent glass. It is observed that it is not homogeneous if there is a phase separation (Suena et al. 2020).

2.6. pH Test

One gram of patchouli oil body butter is diluted with 10 mL of distilled water. The universal pH indicator is used to determine the pH of the preparation. The universal indicator paper is immersed in the body butter solution for some time until colour appears. The resulting color is matched or compared with the standard color on the universal pH indicator packaging (Safitri et al. 2016).

2.7. Absorption Test

One gram of patchouli oil body butter is dripped with water while stirring or shaking. Dropping of water on the preparation is carried out until it can no longer absorb water or separation occurs in the preparation, calculate the amount of water needed to separate (Datak et al. 2016).

2.8. Spreadability Test

A total of 0.5 grams of the preparation is placed on a 10x10cm2 glass, covered with a cover glass of the same size, and weighed until it reaches 125 grams, after which the diameter is measured for up to one minute (Hanik Endah Paramita 2020).

2.9. Adhesion Test

The 0.25-gram preparation was sandwiched between two object glasses before being pressed for 5 minutes with a one kg load. The load is removed from the object glasses, and the test instrument is then mounted on the object glasses. A load of 80 grams is applied to the test equipment, and the time taken for the preparation to be released from the object-glass is recorded (Hanik Endah Paramita 2020).

3. RESULTS AND DISCUSSIONS

3.1. Patchouli Oil Body Butter

Melting the oil and heating the water are the first steps in making body butter. This procedure is carried out to facilitate the oil and water phases to mix and form an emulsion corpus. Because the water phase has a lower viscosity than the oil phase, the aqueous phase is mixed with the oil phase to reduce the volume of product transferred during the manufacturing process, stirred at a constant speed after mixing to aid in the formation of an emulsifier, namely triethanolamine stearate. This compound will bind the water and oil phases together, preventing phase separation and forming an emulsion that meets the body butter preparation criteria (Figure 1). After that, the physical quality of the body butter preparation was assessed in each cycle for a total of seven cycles.

Figure 1. Patchouli oil body butter formulation

3.2. Evaluation of the Physical Quality of Patchouli Oil

The accelerated stability test was carried out in seven cycles. Each cycle was treated at extreme temperatures of 4 ± 2oC and 40 ± 2oC. The goal of the extreme temperature treatment is to simulate the storage environment. The product is assumed to have been stored at room temperature for six months during the seven cycles (Fitriani et al., 2017). Organoleptically, there was no change in the color, odor, and homogeneity of the preparation in each cycle. This is indicated by the absence of particles or droplets of separating phases visible on the object-glass. Homogeneous preparations indicate that the active ingredients are evenly dispersed in the base, with the same amount of active ingredients in each part of the preparation. If the active ingredient is not

evenly dispersed throughout the base, it will not have the same therapeutic effect.

3.3. Patchouli Oil Body Butter pH Test

One indicator that affects the level of safety of cosmetic preparations is the pH test. To avoid skin irritation, topical preparations should have the same pH range as the skin. The pH of the skin is usually between 4-6. (Rusmana 2019).

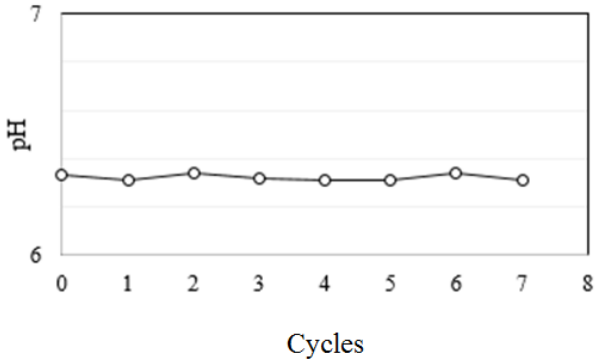

Figure 2. pH of patchouli oil body butter preparation, n=3, where n is the number of samples

Figure 2 shows that the pH value in each test cycle is within the skin pH range, and there is no statistically significant difference ($p>0.05$) between the test cycle value. This indicates that the pH value of the body butter formulation did not change during the six-month room temperature storage period.

3.4. Patchouli Oil Body Butter Absorption Test

The occurrence of separation after the addition of 10 mL of water comes from testing the preparation's absorption capacity. The purpose of an absorption test is to determine the preparation's ability to absorb water. The skin absorption test must have an appropriate solubility in minerals and water, with a concentration of more than 1 mg of cream dissolved in 1 mL of water (Suena et al. 2020). According to the tests, 1 gram of patchouli oil body butter can be dissolved in 10 mL of water, equivalent to 100 mg of body butter soluble in 1 mL of water, indicating that patchouli oil body butter meets the absorption requirements of >1 mg/1 mL water.

3.5. The Spreadability and Adhesion Test of Patchouli Oil Body Butter

In the case of body butter preparations, the spreadability test was repeated three times. This test is used to determine how well the preparation disperses on the skin. Around 5-7 cm is a good dispersion of the preparation (Lumentut et al. 2020). Because of the good dispersion, the contact between the preparation and the skin is more expansive, allowing for faster absorption of the active ingredients. Table 1 shows the results of the patchouli oil body butter preparation's test results. According to the test results, the patchouli oil body butter preparation met the criteria. The dispersion power did not differ significantly ($p>0.05$) from the beginning to the end of the stability testing cycle.

Table 1. Spreadability and adhesion of patchouli oil body butter in every cycle of stability test

Cycle	Parameter	
	Spreadability	Adhesion
0	5.25±0.02	1.89±0.14
1	5.25±0.00	1.88±0.09
2	5.11±0.06	1.91±0.02
3	5.10±0.03	1.97±0.01
4	5.08±0.02	2.06±0.05
5	5.08±0.02	2.18±0.04
6	5.08±0.00	3.21±0.11
7	5.02±0.02	3.27±0.06

The purpose of the adhesion test is to see if the preparation can stick to the skin. The greater the preparation's ability to adhere to the skin, the longer the preparation will have a therapeutic effect. Table 1 shows the results of the adhesiveness test performed on the buffer. Although there are no specific adhesion criteria, it is preferable if semisolid preparations adhere for more than 1 second (Rohmani et al. 2019). As can be seen, the stickiness of patchouli oil body butter preparations has an adhesion power of >1 second, indicating that the preparation can adhere to old skin and provide an optimal therapeutic effect.

4. CONCLUSIONS

Based on the study's findings, it can be concluded that using stearic acid and triethanolamine as emulsifiers in the formulation of patchouli oil body butter provides good stability in each cycle of physical stability testing. As a result, the formulation can be said to be stable for six months when stored at room temperature.

ACKNOWLEDGMENTS

Thank you to the Atsiri Research Center of Universitas Syiah Kuala for providing materials and tools to ensure this research runs smoothly.

REFERENCES

Datak G, Ardiyani VD, Mahalia LD. (2016). Formulasi Sediaan Krim Ekstrak Daun dan Kulit Batang Kalapapa (Vitex pinnata L.) sebagai Obat Penyembuh Luka [Formulation of Cream for Leaf and Bark Extract of Kalapapa (Vitex pinnata L.) as a Wound Healing Medicine]. Paper presented at the Prosiding Seminar Nasional Ilmu Kesehatan.

Dewi R, Anwar E, Yunita K. 2016. Uji Stabilitas Fisik Formula Krim yang Mengandung Ekstrak Kacang Kedelai (Glycine max) [Physical Stability test of Cream Formulation Containing Soybean Extract (Glycine max)]. Pharmaceutical Sciences and Research (PSR). 1(3): 194-208.

Ervianingsih N, Razak A. 2019. Formulasi Sediaan Deodoran Lotion dari Minyak Atsiri Nilam (Pogostemon cablin Benth) [Deodorant Lotion Preparation Formulation from Patchouli Essential Oil (Pogostemon cablin Benth)]. Jurnal Fenomena Kesehatan. 2(1): 188-196.

Fitriani EW, Kartini K, Khanis E. 2017. Formulasi dan Uji Stabilitas Fisik Krim Asam Ursolat [Ursolic Acid Cream Physical Stability Formulation and Test].

Hanik Endah Paramita S. (2020). Formulasi dan Uji Stabilitas Sediaan Gel Hand Sanitizer Ekstrak Etanol Buah Mentimun (Cucumis sativus L.) [Formulation and Stability Test of Gel Hand Sanitizer of Cucumber (Cucumis sativus L.) Ethanol Extract]. STIKES RS Anwar Medika.

Lumentut N, Edi HJ, Rumondor EM. 2020. Formulasi dan Uji Stabilitas Fisik Sediaan Krim Ekstrak Etanol Kulit Buah Pisang Goroho (Musa acuminafe L.) Konsentrasi 12.5% Sebagai Tabir Surya [Formulation and Physical Stability Test Preparation of Ethanol Extract Cream for Goroho Banana Peel (Musa acuminafe L.) with Concentration of 12.5% as Sunscreen]. Jurnal MIPA. 9(2): 42-46.

Rohmani S, Kuncoro MA. 2019. Uji Stabilitas dan Aktivitas Gel Handsanitizer Ekstrak Daun Kemangi [Stability and Activity Test of Basil Leaf Extract Handsanitizer Gel]. JPSCR: Journal of Pharmaceutical Science and Clinical Research. 4(1): 16-28.

Rusmana WE. 2019. Formulasi Lotion Organik Ekstrak Kulit Manggis (Garcinia Mangostana L.) dan Uji Efektivitas Terhadap pH Kulit [Organic Lotion Formulation of Mangosteen Peel Extract (Garcinia Mangostana L.) and Effectiveness Test on Skin pH]. Jurnal INFOKES (Informasi Kesehatan). 3(2): 102-114.

Sabrina TA. (2017). Uji Stabilitas Dipercepat Sediaan Krim Gamma oryzanol [Accelerated Stability Test of Gamma oryzanol . Cream Preparations]. UIN Syarif Hidayatullah Jakarta: Fakultas Kedokteran dan Ilmu Kesehatan, 2017.

Safitri M, Zakky M, Erawati E. 2016. Pengembangan Formulasi dan Evaluasi Fisik Sediaan Krim Ekstrak Etanol 70% Daun Labu Siam (Sechium edule (Jacq.) Swatz) [Formulation Development and Physical Evaluation of 70% Ethanol Extract Cream for Siamese Pumpkin Leaves (Sechium edule (Jacq.) Swatz)]. Jurnal Farmagazine. 3(2): 7-15.

Shabrina A, Pratiwi AR, Muurukmihadi M. 2020. Stabilitas Fisik Dan Antioksidan Mikroemulsi Minyak Nilam Dengan Variasi Tween 80 Dan PEG 400 [Physical Stability And Antioxidant Patchouli Oil Microemulsion With Variation Tween 80 And PEG 400]. Media Farmasi. 16(2): 185-192.

Suena NMDS, Meriyani H, Antari NPU. 2020. Uji Mutu Fisik dan Uji Hedonik Body Butter Maserat Beras Merah Jatiluwih [Physical Quality Test and Hedonic Test of Jatiluwih Red Rice Maserat Body Butter]. Jurnal Ilmiah Medicamento. 6(1): 59-65.