Journal of
Patchouli and Essential Oil Products

JPEOP

Vol. 1, No.1, Page 11- 13, June 2022

Sunscreen Innovation Using Aceh Patchouli Oil Extraction

Elly Sufriadi[1,8], Suraiya Kamaruzzaman[2,8*], Putri Athaya Maulida[3], Ismi Zatya[4], Intan Mulia Savira[5], Zulfahmi[6], Friesca Erwan[7,8]

[1]Department of Chemistry, Faculty of Mathematics and Natural Science, Universitas Syiah Kuala
[2]Chemical Engineering Department, Faculty of Engineering, Universitas Syiah Kuala
[3]Agribusiness Department, Department, Faculty of Agriculture, Universitas Syiah Kuala
[4]Department of Chemical Education, Faculty of Teacher Training and Education, Universitas Syiah Kuala
[5]Department of Plant Protection, Faculty of Agriculture, Universitas Syiah Kuala
[6]Department of Agriculture Products Technology, Faculty of Agriculture, Universitas Syiah Kuala
[7]Industrial Engineering Department, Faculty of Engineering, Universitas Syiah Kuala
[8]Atsiri Research Centre, PUI-PT Nilam Aceh, Universitas Syiah Kuala
*** Corresponding author email address**: suraiya_k@unsyiah.ac.id

Received : 13 October 2021; Accepted : 9 December 2021; Published online : 29 April 2022

Abstract

Sunscreen aims to protect the skin from direct sun exposure. This cosmetic product is included in the type of cream. Sunscreen is made from patchouli oil as the main ingredient. The ingredients used in making the sunscreen in each package contain Niacinamide, Avobenzone, Patchouli Oil, Emulgade SE-PE, Cutina GMS SE, Isopropyl Myristate, Dimethicone, Cetiol CC, Glycerin, Phenoxyethanol, Disodium EDTA, and Aquades. The tools used are hot plates, scales, magnetic stirrer, stirring spoons, measuring cups, baking glasses, and pipettes. This sunscreen production method is divided into two phases, namely phase A and phase B. In phase A Niacinamide and Avobenzone are mixed at a speed of 2500 rpm, Temperature 70o C for 15 minutes. In phase B, Phenoxyethanol, Disodium EDTA, and Aquades were mixed at a speed of 2500 rpm, a temperature of 70o C for 15 minutes. The next step is that the two phases are mixed at a speed of 1000 rpm, a temperature of 40o C for 10 minutes until homogeneous, then packaged. The results of the research will be carried out by laboratory tests. The indicators to be tested are organoleptic test, homogeneity test, pH test, cream irritation test and photoprotector activity test. The results of each organoleptic test of sunscreen were white, soft texture, patchouli oil aroma, stickiness on the skin was classified as sticky. Homogeneity test showed homogeneous sunscreen, the test was carried out using glass preparations. A certain amount of cream is applied to the slide and visually observed. This test was repeated three times. The cream pH test was carried out using a pH meter, carried out with a number of creams dissolved in aquadest and dipped in a pH measuring instrument. Based on the irritation test, sunscreen does not cause irritation. The test was carried out in vivo, the cream was applied to the back of the hand repeatedly for 3 days to 10 respondents aged 19-22 years.

Keywords: patchouli oil, sunscreen, oil extraction, hi-grade patchouli oil

1. INTRODUCTION

Patchouli oil (Pogestemon cablin Benth) is a native plant from the Philippines which is widely cultivated in Brazil, China, Indonesia. Patchouli oil or often called Patchouli oil is obtained from the process of distilling the stems, leaves and branches of the patchouli plant. Patchouli oil contains the main component, namely Patchouli alcohol with the molecular formula C15H26O. The essential oil in patchouli oil is often used in soaps, cosmetics and perfumes. Patchouli oil has an important role in determining the strength, nature, and durability of the resulting odour. Because Patchouli alcohol in patchouli oil has the property of being able to bind to odours from other fragrances and can create a harmonious smell when it is mixed (Ginting et al., 2021; Soh et al., 2020; Feng et al., 2019; Swamy & Sinniah., 2015)

High levels of Patchouli alcohol indicate better oil quality (Kusuma & Mahfud, 2018). Several previous studies have proven the use of deep oil as antibacterial, anti-inflammatory, antiseptic, aromatherapy, skin care perfume by regenerating the skin, removing scars from eczema, acne and insect bites (Ginting, et al., 2021; Parmar, et al., 2020; Zhao, et al., 2020; Chevallier in Kusuma, & Mahfud., 2018). Results of research conducted by Li N , et al., 2014 on the protective effect of patchouli oil by 28.2% against photoaging of the skin with UV induction that in tests on mice, the results obtained indicate the provision of patchouli oil at a dose of 6mg and 9 mg , significantly inhibits the

improvement of skin wrinkles, reduces the reduction of kinetic elasticity and increases the collagen content of about 21.9% and 26.3%, respectively.

Photoaging is a process of premature aging of the skin caused by continuous exposure to the sun's ultraviolet (UV) in the long term which will cause sunburn, rough wrinkles, loss of elasticity and actinikeratosis (Matsumura & Ananthaswamy, 2004). Currently, the use of sunscreen has been widely used and has attracted users because it functions to protect the skin from sunburn, photoaging and photo carcinogenesis (Hailun, et al., 2021). The demand for sunscreens will continue to increase and become a significant opportunity for the pharmaceutical industry to meet UV protection creams. In accordance with previous research on patchouli oil as a skin protector from UV rays, this study wanted to produce a cosmetic product in the form of a facial protective cream or sunscreen that uses patchouli alcohol from the patchouli plant with the addition of niacinamide. Niacinamide is a form of vitamin B3 biologically active and are found widely in vegetable and yeast that can improve on the skin (Zhu and Gao, 2008). This sunscreen cream formulation is expected to be of good quality, efficacious, safe and aesthetically appealing.

2. MATERIALS AND METHODS

2.1 Materials and composition

In this study, a light fraction of patchouli oil was added as a renewal innovation in the manufacture of sunscreen. This sunscreen is formulated using the best ingredients such as niacinamide which acts as a skin brightener and patchouli oil as an antibacterial which can be used on sensitive facial skin types.

The equipment used in the manufacture of this sunscreen are a hot plate, scales, magnetic stirrer, stirring spoon, measuring cup, baker glass, and dropper. The ingredients used in the manufacture of this sunscreen are Niacinamide, Avobenzone, Patchouli Oil, Emulgade SE-PE, Cutina GMS SE, Isopropyl Myristate, Dimethicone, Cetiol CC, Glycerin, Phenoxyethanol, Disodium EDTA, and Aquades. Sunscreen working procedure is showed in Figure 1.

Weigh all ingredients, namely Niacinamide, Avobenzone, Patchouli Oil, Emulgade SE-PE, Cutina GMS SE, Isopropyl Myristate, Dimethicone, Cetiol CC, Glycerin, Phenoxyethanol, Disodium EDTA, and Aquades. Put Emulgade SE- PE, Cutina GMS SE, Isopropyl Myristate, Dimethicone, Cetiol CC, and patchouli oil into container 1. Then melted at 70◦c until all melted using a homogenizer at 2500 rpm for 15 minutes. Then added niacinamide and avobenzone, stirred until it becomes a creamy mass (Phase A). Phenoxyethanol was dissolved in glycerin, then disodium EDTA was added which had been dissolved in 70◦c warm distilled water. Homogenize with a homogenizer at a speed of 2500 rpm for 15 minutes (Phase B). Put Phase B into the Phase A container, stir with a homogenizer at a speed of 1000 rpm for 10 minutes until it becomes a creamy mass and let it cool to a temperature of 40◦c. Stirring continues until a homogeneous consistency of cream is formed. Put the cream that has met the requirements into the primary packaging, close it, label it, and put it in the secondary packaging along with the brochure.

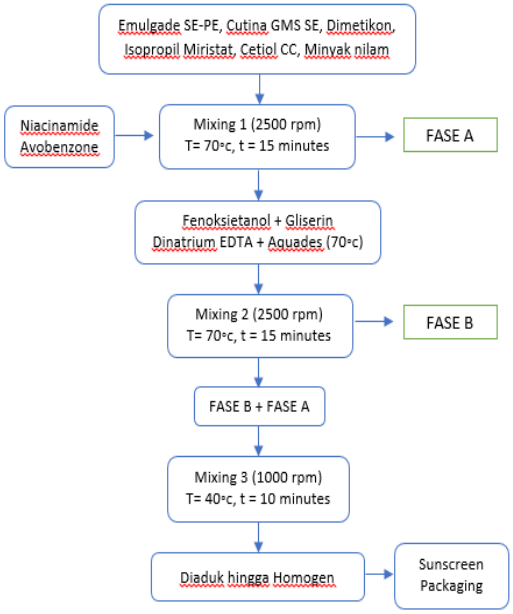

Figure 1. Sunscreen Working Procedures

3. RESULTS AND DISCUSSIONS

This research involves organoleptic test to assess the product's criteria. Organoleptic observations included colour, texture, odour and stickiness for 7 consecutive days. The result obtained is a white sunscreen cream, soft texture and a characteristic smell of patchouli oil. However, the sample tested was sticky when applied to the back of the hand.

Table 1. Organoleptic Test Results

Characteristic			
Colour	Texture	Odour	Stickiness
White	Soft	Patchouli oil	Sticky

4. CONCLUSIONS

Based on the results, the research makes a conclusion as follow:

1. Patchouli oil can be made into sunscreen raw materials.
2. The material mixing process is divided into two phases. Phase A is mixing niacinamide and avobenzone and phase B is mixing phenoxyethanol, glycerin, disodium EDTA and aquades.

3. Sunscreen is safe to use on the skin because the material used is a suitable material in making body lotions.
4. The amount of patchouli oil used is 0.03% of 100 mg of material.
5. Speed of 2500 rpm, temperature of 70◦C for 15 minutes used the same for both production phases.

ACKNOWLEDGMENTS

Authors would like to thank Atsiri Research Center PUI-PT Nilam Aceh of Universitas Syiah Kuala for providing full support on materials and tools to ensure this research runs smoothly.

REFERENCES

Feng, X.Y., Wang, Y., You, C.X., Guo, S.S., Du, S.Y., & Du, S.S. (2019). Bioactivities of patchoulol and phloroacetophenone from Pogostemon cablinessential oil against three insects. International Journal of Food Properties, 22, https://doi.org/10.1080/10942912.2019. 1648508

Ginting, Z., Ishak., Ilyas, M. (2021). Analisa Kandungan Patchouli Alkohol dalam Formulasi Sediaan Minyak Nilam Aceh Utara (Pogestemon Cablin Benth)Sebagai zat Pengikat Parfum (Eau De Toilette. Jurnal Teknologi Kimia Unimal, 10(1).

Ginting, Z., Ishak., Ilyas, M. (2021). Efektivitas Produk Anti Septik Alami dalam Mencegah Penyebaran Covid-19. Jurnal Teknologi Kimia Unimal, 10(1)

Hailun, H., Anaqi, L., Ahiqin, L., Jie. T, Li, L., &Lidan, X. (2021). Natural components in sunscreens: Topical formulations with sun protection factor (SPF). Biomedicine & Pharmacotherapy,134. https://doi.org/10.1016/j.biopha.2020.111161

Kusuma, S.H., Altway, A., & Mahfud. M. (2018). Solvent-free microwave extraction of essential oil from dried patchouli (Pogostemon cablin Benth) leaves.Journal of Industrial and Engineering Chemistry,58. https://doi.org/10.1016/j.jiec.2017.09.047

Lin, F.R., Feng, X.X., Li, C.W., Zhang, J.X., Yu, X.T., Zhou, J.Y., Zhang, X., Xie, Y.L., Su, Z.R & Zhan, J.Y.X. (2014). Prevention of UV radiation-induced cutaneous photoaging in mice by topical administration of patchouli oil, 154, http://dx.doi.org/10.1016/j.jep.2014.04.020

Matsumura, Y., & Ananthaswamy, N.H. (2004). Toxic Effects of Ultraviolet Radiation on the Skin. Toxicology and Applied Pharmacology, 195. doi: 10.1016/j.taap.2003.08.019

Pamar, A., Kapil, S., Sachar, S., Sharma, S. (2020). Design of experiment based methodical optimization and green syntheses ofhybrid patchouli oil coated silver nanoparticles for enhanced antibacterial activity. Current Research in Green and Sustainable Chemistry, 3. https://doi.org/10.1016/j.crgsc.2020.100016

Soh, H.S., Jain, A., Lee, Y.L., & Jayaraman, S. (2020). Optimized extraction of patchouli essential oil from Pogostemon cablin Benth. with supercritical carbon dioxide. Journal of Applied Research on Medicinal and Aromatic Plants, 19.https://doi.org/10.1016/j.jarmap.2020.10027 2

Swamy, K.M., Sinniah, R.U. (2015). A Comprehensive Review on the Phytochemical Constituents and Pharmacological Activities of Pogostemon cablin Benth.: An Aromatic Medicinal Plant of Industrial Importance. Molecules, 20.doi:10.3390/molecules20058521

Zhao, Y., Yang, Y., Zhang, J., Wang, R., Cheng, B., Kalambhe, D., Wang, Y., Gu, Z., Chen, D., Wang, B., & Huang, Y. (2020). Lactoferrin-mediated macrophage targeting delivery and patchouli alcohol-based therapeutic strategy for inflammatory bowel diseases. Acta Pharmaceutica Sinica B, 10(10). https://doi.org/10.1016/j.apsb.2020.07.019

Zhu, W., & Gao, J. (2008). The Use of Botanical Extracts as TopicalSkin-Lightening Agents for the Improvement of Skin Pigmentation Disorders. Journal of Investigative Dermatology Symposium Proceedings, 13. doi:10.1038/jidsymp.2008