Proceeding of the International Conference on Health Sciences and Nursing
Vol. 1, No. 2, 2024
Pages 01-11
Available Online at: https://prosiding.arikesi.or.id/index.php/ICHSN

Psycochemical and Sunscreen Activity Analysist of Nanocream *Kepok* Banana Corm

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Abstract

This study aimed to explore the potential of *kepok* banana pseudostem extract formulated as a nano-cream for its sunscreen properties. The sunscreen efficacy was evaluated in vitro using UV-Vis spectrophotometry to determine SPF values based on Mansur's equation. The nano-cream formulation was optimized through organoleptic evaluation, homogeneity testing, pH measurement, cream type classification, spreadability, adhesion, and particle size analysis, ensuring its stability and suitability for topical use. The results showed that the nano-cream formulations exhibited SPF values of FI 2.2018, FII 2.6646, and FIII 2.7883, with all physical parameters within acceptable limits. The particle size analysis (PSA) results on the nano-cream also revealed that the sample contained particles with an extremely small size range. This study underscores the need for further research to refine the formulation and assess its long-term stability for potential pharmaceutical and cosmetic applications.

Keywords: Corm Extract, *Kepok* Banana, Nano Cream, Psycochemical Test, Spektrofotometri UV-Vis, SPF.

1. INTRODUCTION

The utilization of plant parts generally considered waste is currently limited to meeting daily needs. The corm of the *kepok* banana is primarily used for vegetables and livestock feed (Apriyanti and Balfas, 2019). Theoretically, the *kepok* banana corm holds additional potential as a raw material for pharmaceuticals and cosmetics. Traditionally, the *kepok* banana corm is believed to nourish hair, possesses antibacterial properties, serves as a functional food ingredient, and contains antioxidants (Purnamasari, D. 2019.; Naily, Ulfia, and Satria Pangestu 2012; Pongsipulung, Yamlean, and Banne 2012) . Extracts from the *kepok* banana corm contain flavonoids (Rahmawati et al. 2018; Sari and Raharjo n.d.), with chromophore groups capable of absorbing UV light, thereby conferring the potential of *kepok* banana corm extract to function as a sunscreen (Agusta, Ardiyani, and Arijanto 2021).

Nanotechnology represents a rapidly advancing field. In medicine and cosmetics, nanotechnology plays a crucial role in drug delivery systems due to its particle size in the nanoscale, ranging from 10-1000 nm (Hanum et al. 2019). The utilization of natural substances as raw materials in pharmaceuticals and cosmetics remains limited due to challenges associate with natural ingredients, such as solubility issues, limited absorptio of active compounds, low bioavailability, and stability concerns. These challenges are addressed by preparing formulations through nanotechnology methods (Siqhny, Azkia, and Kunarto 2020). In this study, the formulation is a cream created using nano-cream techniques. The

Received: November 1, 2024; Revised: December 20, 2024; Accepted: January 10, 2025; Published: January 13, 2025

advantages of nanoemulsions include the ability to encapsulate multiple active ingredients, prevention of cracking and creaming, as the nano-cream form offers a large surface area and high energy (Agusta et al. 2021). Based on the description above, this study was conducted to investigate the potential of a nano-cream formulation containing ethanol extract from the *kepok* banana corm as a sunscreen and anti-tyrosinase agent. The sunscreen potential of the ethanol extract in the nano-cream formulation was evaluated in vitro by determining its SPF value using UV-Vis spectrophotometry, following Mansur's equation. Meanwhile, the sunscreen extract's potential as an anti-tyrosinase agent was assessed through in silico analysis.

2. LITERATURE REVIEW

The utilization of plant parts, especially those often considered waste, is still primarily limited to basic daily needs. The corm of the *kepok* banana, commonly used as a vegetable and livestock feed (Apriyanti and Balfas, 2019), theoretically has broader potential as a raw material for pharmaceuticals and cosmetics. Traditionally, it is believed to promote hair health, possesses antibacterial properties, serves as a functional food ingredient, and is rich in antioxidants (Purnamasari, D. n.d.; Naily, Ulfia, and Satria Pangestu 2012; Pongsipulung, Yamlean, and Banne 2012). Research indicates that the *kepok* banana corm contains flavonoids (Rahmawati et al. 2018; Sari and Raharjo n.d.), which have chromophore groups that absorb UV light, suggesting potential as a natural sunscreen (Agusta, Ardiyani, and Arijanto 2021). Nanotechnology, a rapidly advancing field, has become essential in cosmetics and medicine, especially for drug delivery systems, due to its particle sizes ranging from 10–1000 nm, which enhance bioavailability and stability of active compounds (Hanum et al. 2019). Using nanotechnology, natural ingredients can overcome solubility and absorption limitations, thereby enhancing their effectiveness in formulations (Siqhny, Azkia, and Kunarto 2020). This study focuses on developing a nano-cream formulation using ethanol extract from the *kepok* banana corm, aiming to evaluate its potential as a sunscreen and anti-tyrosinase agent. The nano-cream formulation offers advantages in encapsulating active ingredients and enhancing stability, as it prevents cracking and creaming due to a large surface area and high energy (Agusta et al. 2021). The sunscreen efficacy of the extract in the nano-cream was assessed in vitro by measuring its SPF value with UV-Vis spectrophotometry, following Mansur's equation, while its anti-tyrosinase potential was examined through in silico analysis.

3. METHODS

The research methodology is described in detail in the following procedures. The study will be conducted at the Pharmacognosy and Instrument Laboratory of the Health Polytechnic Putra Indonesia Malang.

1. Preparation of *Kepok* Banana Corm Extract

Kepok Banana Corm simplicia weighing 25 grams was placed in a beaker glass, then 250 mL of solvent was added and stirred. The solvents used were water and n-hexane separately. The maceration was carried out for 3 hours at room temperature, then sonicated (200 W, 40 KHz) for 30 minutes, 70 ℃. The extract obtained was filtered and the residue was remacerated with each solvent. The remacerated filtrate was combined with the initial filtrate and then concentrated to a thickness of 50 mL using a rotary evaporator under vacuum at 55℃. The concentrated extract was centrifuged for 10 minutes to remove any solids that may have escaped during filtration. The extract was stored in a freezer until frozen, then lyophilized for 62 hours to obtain dry extract in powder form (Andishmand et al. 2023).

2. Formulation of Nano-Cream from *Kepok* Banana Corm Extract

Table 1. Nano-Cream Formulation with Combined *Kepok* Banana Corm Extract

Subtance/material	Quantity			Function
	F1	F2	F3	
Kepok Banana Corm Extract	5	10	15	Active substance
Stearic acid	5	5	5	Emulsifier
Cetyl alcohol	0.2	0.2	0.2	Stiffening agent
Glycerol	1	1	1	Emollient
Triethanolamine	0.4	0.4	0.4	Emulsifier
Methylparaben	0.02	0.02	0.02	Preservative
Propylparaben	0.01	0.01	0.01	Preservative
Aqua (or Purified Water)	100	100	100	Solvent

Source: (Andini et al. 2024; Hanifah Z, et al. 2019)

The nano-cream preparation follows the methodology of (Hanifah et al. 2019.), with modifications as follows: the base ingredients are mixed with a mixer according to the formulation in Table 1 for 15 minutes, followed by the addition of the active ingredient, which is mixed for 20 minutes and then sonicated for 30 minutes (Septiyanti et al. 2024). The nano-cream is then packaged and prepared for testing.

3. Physical Property Evaluation of *Kepok* Banana Corm Extract Nano-Cream

The final evaluation includes assessing the physical properties of the cream formulation, such as organoleptic testing, homogeneity test, pH measurement, nano-cream

type classification, spreadability test, adhesion test, and particle size measurement (Hanifah et al. 2019.).

The organoleptic test was performed by examining the color, form, and odor of the nano-cream preparation (Pratasik, Yamlean, and Wiyono, 2019)

The homogeneity test was conducted by applying 1 gram of nano-cream onto a glass slide. The formulation is considered homogeneous if no mixed particles are observed (Pratasik et al. 2019)

The cream type test was conducted by diluting the cream with water in a test tube. If the cream could be diluted, it was classified as O/W (oil-in-water). Conversely, if it could not be diluted, it was classified as W/O (water-in-oil) (Pratasik et al. 2019a)

The spreadability test was conducted by weighing 1 gram of cream, placing it on a glass plate, and then applying a 50-gram weight on top. The weight was left for 1 minute, after which the spread diameter was measured (Pratasik et al. 2019a)

The adhesion test was performed by applying 0.5 grams of cream onto a glass plate. The two plates were then pressed together until they adhered. The cream between the plates was subjected to a 50-gram weight for 5 minutes. The adhered glass plates were mounted on an adhesion testing apparatus and separated with an 80-gram weight. The time taken for the plates to separate was recorded. The test was replicated three times (Pratasik et al. 2019a)

The viscosity of the cream was measured using a Brookfield LV viscometer, with each formulation being replicated three times. A 100-gram sample of the preparation was placed in a glass beaker, after which the spindle was installed, and the rotor was activated (Pratasik et al. 2019a)

The particle measurement method was conducted by dissolving 100 µL of the sample into 4 mL of phosphate buffer solution at pH 7.4, followed by analysis using a Particle Size Analyzer at 25°C. This procedure was replicated three times for accuracy (Universitas Brawijaya et al. 2020).

4. In Vitro SPF Value Determination of *Kepok* Banana Corm Extract Nano-Cream

In vitro SPF evaluation is conducted using UV-Vis spectrophotometry, based on previous studies with slight modifications (22). Nano-cream formulations FI, FII, and FIII (in triplicate) are dissolved in ethanol in a 100 mL volumetric flask, ultrasonicated for 5 minutes, and filtered. A 5 mL aliquot of the filtrate is placed into a 50 mL volumetric flask and further diluted with ethanol. The solution's absorbance is measured at wavelengths 290-320 nm, with ethanol as a blank. SPF values are calculated using Mansur's.

5. Data Analysist

All data are presented as mean ± standard deviation and statistically analyzed using SPSS software version 16.

4. RESULTS

Test	FI	FII	FIII
Organoleptic test	Form: Cream Odor: Characteristic of the extract Color: Off-white to brownish	Form: Cream Odor: Characteristic of the extract Color: Light brown	Form: Cream Odor: Characteristic of the extract Color: Darkish brown
Homogeneity	Homogeneity: Achieved	Homogeneity: Achieved	Homogeneity: Achieved.
pH	6,1333 ± .05164	6,0333 ± .05164	6,0166 ± .04082
Classification of nano-cream type	Oil in water	Oil in water	Oil in water
Spreadability	4,1266 ± .042041	6,09267 ± .125702	8,09200 ± .144272
Adhesion	1,9583 ± .18649	1,2517 ± .05492	1.0400 ± .01673
Viscosity	2,4480 ± 1.539558	1.4070 ± .423840	3.5900 ± .416413
SPF	2,2018 ± .0760845	2,6646 ± .0308663	2,7883 ± .0350655
PSA	0,127 µm ± 0,285	0,036 µm ± 0,126	0,766 µm ± 1,105

5. DISCUSSION

The organoleptic results from the three nano cream samples indicated that all samples exhibited a cream or semisolid formulation. The color observed in the three formulations varied: F1 displayed an off-white to brownish hue, F2 appeared light brown, and F3 exhibited a dark brown shade. The scent emitted by all three formulations was identical, characterized by the distinct aroma of banana corm peel. As the concentration of banana corm peel increased, the intensity of its characteristic aroma also strengthened. These findings are in accordance with the study by Syarifah et al. 2022, which suggests that higher concentrations of natural extract result in a more intense color and a stronger aroma.

Next is the homogeneity test. The homogeneity test indicated that all three formulations were homogeneous, with no visible particles. This test was conducted to ensure that all phases—namely the aqueous phase, oil phase, and extract—were uniformly mixed. Such testing is crucial to confirm that the active ingredients in the cream are evenly distributed, as this ensures that when the cream is applied to the skin, each area has an equal

opportunity to benefit from the substances contained in the nano cream formulation (Ginting and Andry, 2023).

pH test was conducted to determine whether the nano cream is acidic or alkaline. According to (Suleman, Handayani, and Wahyuni 2022), the pH range of skin is between 4.5 and 6.5. The pH test results showed a value of 6.1333 ± 0.05164 for F1, 6.0333 ± 0.5164 for F2, and 6.0166 ± 0.04082 for F3. These results indicate that all three formulations fall within the skin's acceptable pH range. It can also be observed that as the concentration of the extract increased, the pH value slightly decreased. pH testing was also conducted with statistical analysis using the one-way ANOVA method, where the result ($p>0.05$) indicated no significant differences among the formulations.

In the cream type test, the results revealed that the nano cream is of the oil-in-water (O/W) type. The formulated cream was classified as an O/W emulsion. According to (Arbie, Sugihartini, and Wahyuningsih 2021), oil-in-water creams exhibit superior spreading ability compared to water-in-oil emulsions.

The spreadability test was conducted to evaluate the distribution of the nano-cream on the skin. An optimal nano-cream is one that can be easily applied comfortably without requiring excessive pressure (Lumantow, Hosea Jaya Edy, and Jainer Pasca Siampa 2023). The results from the three formulations showed an average spreadability range of 4.1 to 6 cm, indicating that the addition of the extract influences the spreadability of the nano-cream. This finding aligns with the study by (Rikadyanti, Sugihartini, and Yuliani 2021), which asserts that increasing the concentration of *kepok* banana corm extract significantly enhances the spreadability; conversely, an increase in viscosity results in a thinner cream, thereby increasing the spread diameter and length. The results obtained from the three formulations showed that F1 did not meet the required spreadability range of 5–7 cm for creams. Statistical analysis using one-way ANOVA was conducted on the spreadability measurement results of the nano-cream formulations containing different concentrations of *kepok* banana corm extract. This analysis aimed to determine whether there were differences in pH values based on the varying concentrations of the extract. The statistical results from the three formulations with different extract concentrations indicated no significant differences, with a p-value < 0.05, which led to the acceptance of Ha and the rejection of H0. The alternative hypothesis (Ha) suggests that there is a significant difference in the combination of *kepok* banana corm extract on the characteristics of the resulting cream.

The purpose of the adhesion test is to evaluate how effectively the cream adheres to the skin (Puspitasari, Mulangsri, and Herlina 2018). The quality of the cream improves as the

duration it remains on the skin's surface increases (Zukhri, Hidayati, and Sutaryono 2020). The adhesion time for the prepared creams ranged between 9 and 6 seconds, based on the findings from testing the three formulations. This indicates that the adhesion value decreases as the concentration of banana corm extract increases. This observation is further supported by the fact that as the extract concentration in the cream rises, its consistency thins, which is reflected in the decreasing viscosity values, ultimately reducing its adhesion capacity (Rikadyanti et al. 2021). The results obtained are consistent with the findings of (Latif, Sugihartini, and Guntarti 2021), where a decrease in cream adhesion was observed with the addition of Moringa leaf ethanol extract. All three formulations meet the required criteria for cream adhesion, which is greater than 4 seconds (Anindhita and Arsanto 2020). Statistical analysis was also performed using the one-way ANOVA method, where the result ($p>0.05$) indicated no significant differences among the formulations.

The viscosity test was conducted to determine the degree of consistency produced by the cream (Pratasik, Yamlean, and Wiyono 2019b). One of the viscosity values, FII, did not fall within the acceptable consistency range for formulations, which is between 2,000 and 50,000 cps. However, the viscosity values for' F1 and FIII were within the acceptable range, with values of 2,448.0 cps and 3,590.0 cps, respectively. In the statistical analysis using the one-way ANOVA method, a result of $p>0.05$ was obtained, indicating no differences among the formulations.

In the SPF test of the nano-cream, the results were FI 2.2018 µm; FII 2,6646 µm, and FIII 2,7883 µm. An increase in results was observed across the three concentrations, likely due to the addition of the extract. Statistical analysis, conducted using the one-way ANOVA method, yielded a result of $p<0.05$, indicating a significant difference in SPF outcomes due to the addition of *kepok* banana corm extract.

The particle size analysis yielded three primary fractions, designated as FI, FII, and FIII, with respective particle sizes of 0.137 nm, 0.036 nm, and 0.776 nm. These measurements indicate that the sample contains particles across a range of extremely small sizes, all in the sub-nanometer scale, which is indicative of a highly refined or nanoscale dispersion. Such small particle sizes often suggest that the sample may have undergone processing to enhance its surface area, improve solubility, or increase bioavailability, as is common in formulations that require efficient cellular uptake or enhanced interaction with biological targets (Hanifah et al. 2019.)

Each fraction's specific particle size can imply different stability or functional characteristics within a formulation (Universitas Brawijaya et al. 2020). For instance, the

smaller particles in FII (0.036 nm) may have high surface energy, which could contribute to reactivity or increased absorption, whereas the larger particles in FIII (0.776 nm) might offer structural support or slower release properties in the formulation(Widyantoro 2021). The variety in particle sizes could reflect intentional design for multi-functional applications, where different particle sizes are used to achieve distinct effects within the same sample (Hanifah et al. 2019.). According to statistical analysis using the one-way ANOVA method, a result of $p<0.05$ indicated a significant difference in PSA outcomes due to the addition of *kepok* banana corm extract.The discussion section is arguably the most important part of an article, as it is the last section a reader sees and can significantly impact their perceptions of the article and the research conducted. Different authors take varied approaches when writing this section. The discussion section should:

6. CONCLUSION

Based on the research findings, it can be concluded that the nano-cream formulation meets the characteristics of a cream preparation, demonstrating consistent appearance, color, odor, and type (O/W). The pH of the cream is approximately 6. The highest spreadability was observed in F3 (8.0920 ± 0.1443) > F2 (6.0927 ± 0.1257) > F1 (4.1266 ± 0.0420), while the longest adhesion time was found in F1 (1.9583 ± 0.1865) > F2 (1.2517 ± 0.0549) > F3 (1.0400 ± 0.0167), and the highest viscosity was observed in F3 (3.5900 ± 0.4164) > F1 (2.4480 ± 1.5396) > F2 (1.4070 ± 0.4238). From these characteristics, it can also be concluded that the addition of *kepok* banana pseudostem extract did not significantly affect adhesion, but caused differences in pH, spreadability, and viscosity across the formulations. The SPF test results indicate that higher extract concentrations correlate with higher SPF values. The particle size analysis (PSA) conducted on the nano-cream also showed that the sample contains particles with a very small size range.

7. LIMITATION

A limitation of this study is the exclusive use of in vitro and in silico methods to assess the sunscreen and anti-tyrosinase potential of the *kepok* banana corm extract nano-cream. While in vitro SPF determination and in silico anti-tyrosinase modeling provide valuable preliminary insights, they do not replicate the full complexity of human skin or metabolic interactions that occur in vivo. Additionally, this study relies on a specific formulation of nano-cream and focuses on ethanol extracts, which may limit the generalizability of results to other types of extractions or formulations. Furthermore, the

stability, safety, and long-term efficacy of the nano-cream formulation under various environmental conditions were not addressed, which are essential factors for practical use in cosmetics and pharmaceuticals. Therefore, further in vivo testing and stability assessments are necessary to confirm the potential and safety of the *kepok* banana corm extract nano-cream as a sunscreen and anti-tyrosinase agent in real-world applications.

BIBLIOGRAPHY

Agusta, H., Ardiyani, F., Arijanto, S.N.T. (2021). "Optimasi Konsentrasi Etanol Dan Waktu Maserasi Terhadap Ekstrak Flavonoid Dalam Bonggol Pisang Ambon (Musa Acuminata Colla)." Proceeding Technology of Renewable Energy and Development Conference 1.

Andini, M.R., Masakana, V., Dini, E., (2024). "Physicochemical Characteristics and SPF Value of *Kepok* Banana Corm Extract Cream." Farmasains : Jurnal Farmasi Dan Ilmu Kesehatan 9(1), 8–18. doi: 10.22219/farmasains.v9i1.33835

Andishmand, H., et al. (2023). "Ultrasonication/Dynamic Maceration-assisted Extraction Method as a Novel Combined Approach for Recovery of Phenolic Compounds from Pomegranate Peel." Food Science & Nutrition 11(11), 7160–71. doi: 10.1002/fsn3.3642

Anindhita, M., Arsanto, C. (2020). "Formulasi Krim Ekstrak Daun Kersen (Muntingia Calabura L.) Dengan Variasi Kombinasi Span 60 Dan Tween 80 Sebagai Emulgator." Parapemikir : Jurnal Ilmiah Farmasi 9(2), 50–60. doi: 10.30591/pjif.v9i2.2034

Apriyanti, S., Balfas, R.F. (2019). "Uji Kerapuhan Granul Pati Bonggol Pisang Dengan Metode Granulasi Basah." Jurnal Ilmiah JOPHUS : Journal Of Pharmacy UMUS 1(01),12–17. doi: 10.46772/jophus.v1i01.47

Arbie, S., Sugihartini, N., Wahyuningsih, I. (2021). "FORMULASI KRIM M/A DENGAN VARIASI KONSENTRASI EKSTRAK BUAH PEPAYA (Carica Papaya L.) MENGGUNAKAN EMULGATOR ASAM STEARAT DAN TRIETANOLAMIN." Media Farmasi 16(1),97. doi: 10.32382/mf.v16i1.1420

Ginting, I., Andry, M. (2023). "Pemanfaatan Ekstrak Etanol Kulit Buah Naga Merah (Hylocereus Polyrhizus) Dalam Sediaan Krim Lulur Sebagai Pelembab Alami Kulit." Journal of Pharmaceutical and Sciences 6(3), 1034–49. doi: 10.36490/journal-jps.com.v6i3.179

Hanifah, Z., et al. (2019). "The Effects of Stirring Time at High Speed on Particle Size and Dispersion of Rice Bran γ-Oryzanol Nanocream | PROCEEDING INNOVATION RESEARCH FOR SCIENCE, TECHNOLOGY, AND CULTURE (IRSTC)." https://teknik.univpancasila.ac.id/irstc-5/proceeding/index.php/12345/article/view/310

Hanifah, Z., Ismoyo, T.A., Nugrahani, R.A., Fithriyah, N.H. (2019). "The Effects of Stirring Time at High Speed on Particle Size and Dispersion of Rice Bran γ-Oryzanol Nanocream." Mechanical Engineering.

Hanum, T.I., Laila, L., Sumaiyah, S., Syahrina, E. (2019). "Macadamia Nuts Oil in Nanocream and Conventional Cream as Skin Anti-Aging: A Comparative Study." Open Access Macedonian Journal of Medical Sciences 7(22), 3917. doi: 10.3889/oamjms.2019.533

Latif, A.R., Sugihartini, N., Guntarti, A. (2021). "SIFAT FISIK KRIM TIPE A/M DENGAN VARIASI KONSENTRASI EKSTRAK ETANOL DAUN KELOR (Moringa Oliefera) MENGGUNAKAN EMULGATOR TWEEN 80 DAN SPAN 80." Media Farmasi 16(1), 9. doi: 10.32382/mf.v16i1.1408

Lumantow, V., Edy, H.J., Siampa, J.P., (2023). "FORMULASI DAN PENENTUAN NILAI SPF KRIM TABIR SURYA EKSTRAK KULIT BUAH LEMON SUANGGI (Citrus Limon (L.) Burm. f.) SECARA IN VITRO." PHARMACON 12(3),338–49. doi: 10.35799/pha.12.2023.49023

Naily, F., Ulfia, M., Pangestu, M.M.S, (2012). "TEPUNG TEMPE DAN LIMBAH BONGGOL PISANG SEBAGAI INDUSTRI RUMAHAN."

Nurmahliati, H., Widodo, F., Puspita, O.E. (2020). "Effect of Soy Lecithin and Sodium Cholate Concentration on Characterization Pterostilbene Transfersomes." Pharmaceutical Journal of Indonesia 5(2), 109–15. doi: 10.21776/ub.pji.2020.005.02.7

Pongsipulung, G.R., Paulina, V., Yamlean, Y., Banne, Y., (2012). "FORMULASI Dan PENGUJIAN SALEP EKSTRAK BONGGOL PISANG AMBON (Musa Paradisiaca Var. Sapientum (L.)) TERHADAP LUKA TERBUKA PADA KULIT TIKUS PUTIH JANTAN GALUR WISTAR (Rattus Norvegicus)." PHARMACON 1(2). doi: 10.35799/pha.1.2012.462

Pratasik, M.C.M., Paulina, V., Yamlean, Y., Wiyono, W.I., (2019). "FORMULASI DAN UJI STABILITAS FISIK SEDIAAN KRIM EKSTRAK ETANOL DAUN SESEWANUA (Clerodendron squamatum Vahl.)." PHARMACON 8(2), 261. doi: 10.35799/pha.8.2019.29289

Purnamasari, D. (2019). "Pengaruh Jumlah Air Bonggol Pisang Klutuk Terhadap Sifat Fisik Dan Masa Simpan Hair Tonic Rambut." https://www.scribd.com/doc/212859845/189295885-Pengaruh-Jumlah-Air-Bonggol-Pisang-Klutuk-Terhadap-Sifat-Fisik-Dan-Masa-Simpan-Hair-Tonic-Rambut-Rontok.

Puspitasari, A.D., Mulangsri, D.A.K., Herlina, H., (2018). "Formulasi Krim Tabir Surya Ekstrak Etanol Daun Kersen (Muntingia Calabura L.) Untuk Kesehatan Kulit." Media Penelitian Dan Pengembangan Kesehatan 28(4), 263–70. doi: 10.22435/mpk.v28i4.524.

Rahmawati, F., et al. (2018). "Analisis Fitokimia Dan Uji Antibakteri Ekstrak Bonggol Pisang *Kepok* (Musa Acuminata × Balbisiana)." Majalah Kedokteran UKI 34(4), 177–83. doi: 10.33541/mkvol34iss2pp60

Rikadyanti, R., Sugihartini, N., Yuliani, S. (2021). "SIFAT FISIK KRIM TIPE M/A EKSTRAK ETANOL DAUN KELOR [Moringa Oleifera L] DENGAN VARIASI KONSENTRASI MENGGUNAKAN EMULGATOR ASAM STEARAT DAN TRIETANOLAMIN." Media Farmasi 16(1), 88. doi: 10.32382/mf.v16i1.1423

Sari, M.I., Raharjo, S.J. (2019). “Analysis and Identification of Flavonoid Compounds in *Kepok* Banana Corm Extract (Musa Paradisiaca L).”

Septiyanti, M., et al. (2024). “Nanocream with Active Ingredients of Cardamom Seeds Oil as an Antibacterial Topical Preparation.”

Siqhny, Z.D., Azkia, M.N., Kunarto, B. (2020). “Karakteristik Nanoemulsi Ekstrak Buah Parijoto (Medinilla speciosa Blume).” Jurnal Teknologi Pangan dan Hasil Pertanian 15(1), 1–10. doi: 10.26623/jtphp.v15i1.1888

Suleman, A.W., Handayani, T., Wahyuni, W. (2022). “FORMULASI SEDIAAN KRIM EKSTRAK KULIT BUAH JERUK NIPIS (Citrus Aurantifolia) DAN AKTIVITAS ANTIBAKTERI TERHADAP Staphylococcus Aureus PENYEBAB BISUL.” Jurnal Ilmiah JOPHUS : Journal Of Pharmacy UMUS 4(01), 9–17. doi: 10.46772/jophus.v4i01.842

Syarifah, A.L., Andini, A., Alfad, H., Alfurida, A. (2022). “Pengaruh Variasi Konsentrasi Ekstrak Temugiring (Curcuma Heyneana) Dalam Sediaan Krim Terhadap Nilai SPF.” Journal of Islamic Pharmacy 6(2), 63–67. doi: 10.18860/jip.v6i2.14336

Widyantoro, T. (2021). “TEKNOLOGI PEMBUATAN DAN STABILITAS NANOKRIM DARI BAHAN ALAM: LITERATURE REVIEW”.

Zukhri, S., Hidayati, N., Sutaryono, S. (2020). “UJI SIFAT FISIK DAN EFEKTIVITAS ANTIBAKTERI SALEP EKSTRAK DAUN KATUK (Sauropus androgynus (L) Merr.)TERHADAP Staphylococcus aureus.”