

FORMULATION AND EVALUATION KRIM WAJAH ANTIAGING BERBASIS OF PEGAGANG LEAFEXTRACT-BASED ANTIAGING FACE CREAM DAUN PEGAGANG (CENTELLA ASIATICA)

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ABSTRACT

This study aims to formulate and evaluate an anti-aging facial cream based on ethanol extract of *Centella asiatica* leaves in three concentration variations (1%, 3%, and 5%). The research method used was experimental, which included the process of formulating an oil-in-water emulsion type cream, followed by testing physical parameters (color, odor, pH, viscosity, dispersion power, and adhesiveness) and antioxidant activity testing using the DPPH method and inhibition of elastase and collagenase enzymes. The results showed that all formulas had good physical stability and good physical stability during 28 days of storage. The formula with a 5% extract concentration (F3) showed the highest antioxidant activity (IC₅₀: 48 ppm) and the most effective ability to inhibit enzymes that damage skin structure. Thus, the *Centella asiatica*-based cream formulation is a cream formulation that has great potential as a herbal anti-aging cosmetic preparation, an effective, safe anti-aging cosmetic preparation, and worthy of further development.

Kata Keywords: *Centella asiatica*, krim antiaging cream, antioxidant, sintesis collagen synthesis, elastase collagenase.

INTRODUCTION

Radikal Free radicals are senyawa kimia yang highly reactive chemical compounds because they have one or more elektron yang unpaired electrons berpasangan in orbit their outer orbits. The instability of this structure ini makes it likely bereaksi to react quickly to molekul other molecules, including komponen important components in skin cells and tissues. When radikal free radicals enter the dalam body in excess, either through proses internal processes such as metabolism or faktor external factors such paparan as environmental exposure, dapat terjadi a condition yang known as oxidative stress can occur.[1] This is a state in which the number radikal of free radicals exceeds the ability sistem antioksidan of the body's antioxidant

system to neutralize them. Stres Oxidative stress on the skin can damage serat collagen and elastin fibers that play a role in maintaining skin firmness and elastisitas elasticity, thus triggering signs penuaan of premature aging such as wrinkles, garis fine lines, kulitsagging skin, and the appearance noda of dark spots or hyperpigmentation. Salah One penyebab of the main causes of the formation radikal of free radicals is exposuresinar to ultraviolet (UV) rays from the sun, especially the types of UVA and UVB. This exposure ini can penetrate the layers of the skin and produce reactive oxygen species (ROS), which damage DNA, accelerate the degradation struktur of skin structures, and disrupt fungsi pelindung its natural protective function.

To protect the skin from dampak the harmful

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effects radikal of free radicals, diperlukan langkah preventive measures are needed such as the use tabir surya dengan of broad-spectrum sunscreens , the consumption of foods yang rich in antioxidants (such as vitamins C and E), as well as the use produk perawatan of skin care products yang containing bahan aktif antioxidant active ingredients. Pemahaman yang A good understanding of the role and impact radikal of free radicals allows individuals to take tindakan pencegahan appropriate precautions tepat dalam to maintain healthy skin and prevent kerusakan yang bersifat long-term damage . [2].

Exposure sinar to sunlight has dampak yang bersifat a dualistic impact kesehatan on human health, that is, it can provide both benefits and risks, depending on a number of factors. Efek yang The effect sangat depends on panjang the wavelength cahaya of sunlight that hits the skin, the frequency of exposure to a person, and the intensity of radiation yang received. In kadar yang the right levels, sinar sunlight-specifically spektrum the UVB spectrum-plays an important role in the synthesis of vitamin D in the body, which is much needed for kesehatan bone health and sistem the immune system. However, paparan excessive exposure, especially terhadap sinar to ultraviolet rays (UVA and UVB), can cause dampak adverse effects, such as damage sel to skin cells, penuaan premature aging, the formation radikal of free radicals, to an increased risk kanker of skin cancer. Oleh Therefore , it is important to understand that sinar sunlight is not an enemy or just a friend, but an element of nature that needs disikapi dengan to be handled wisely. Upaya perlindungan Self-

protection efforts such as the use tabir of sunscreen, pakaian protective clothing, and pengaturan time management beraktivitas di luar of outdoor activities are langkah important steps to maximize the benefits sinar of sunlight while minimizing dampak its adverse effects on kesehatan skin and body health as a whole. [3]. Radiasi Ultraviolet (UV) radiation is part of spektrum elektromagnetik the sun's electromagnetic spectrum that has panjang wavelengths between about 100 to 400 nanometers (nm), although in konteks biological contexts, pengaruh the most significant influence umumnya is generally in rentang the 200-400 nm range. Based panjang on the wavelength, radiasi UV radiation is divided into three jenis main types, namely **UVA**, **UVB**, and **UVC**. **UVA** has panjang gelombang the longest wavelength, which is between 320 to 400 nm, and is able menembus to penetrate deeper into lapisan the dermis layer of the skin. Paparan UVA exposure berkaitan erat is closely related to the process penuaan of premature aging and kerusakan collagen damage due to its ability to produce radikal free radicals. **UVB**, with panjang wavelengths between 290 hingga and 320 nm, is kuat secara energetically stronger and bertanggung is responsible for sunburn sunburn terbakar matahari) and can damage the DNA sel of skin cells, yang potentially triggering kanker skin cancer. Sementara Meanwhile, **UVC** has panjang gelombang the shortest wavelength (about 200-290 nm) and is radiasi yang the most dangerous radiation. However, UVC secara is naturally absorbed by lapisan the ozone layer of the atmosphere and does not reach permukaan the Earth's surface in jumlah

significant quantities. Pemahaman mengenai karakteristik masing-masing jenis sinar UV penting dalam upaya perlindungan kulit, baik melalui pemilihan tabir surya yang efektif maupun strategi pencegahan lainnya untuk mengurangi risiko kerusakan kulit jangka panjang akibat paparan sinar matahari [4]. Agen fotokemoprotektif mampu mencegah efek buruk dari radiasi ultraviolet pada kulit, yang disebabkan oleh paparan berlebihan dari radikal bebas [5]. Photokemoprotective agents photokemoprotektif are usually found in products cosmetics.

Penuaan Skin aging is proses biologis a natural biological process yang characterized by reduced elasticity, firmness, and the appearance of wrinkles and garis fine lines on the skin, especially in area the facial area. Proses This process can be accelerated by various faktor external factors such as exposure sinar to ultraviolet (UV) light, pollution, stres oxidative stress, and gaya hidup unhealthy lifestyles . Oleh karena itu, permintaan akan produk perawatan kulit anti-penuaan (antiaging) terus meningkat secara signifikan, baik di tingkat nasional maupun global [6].

Proses penuaan kulit ini dibagi menjadi dua jenis, yaitu penuaan intrinsik (disebabkan oleh faktor internal/genetik) dan penuaan ekstrinsik (dipicu oleh faktor eksternal seperti paparan sinar UV, polusi, dan gaya hidup) [7].

Antiaging secara generally refers to efforts to slow, prevent, or reverse the signs penuaan of skin aging. Salah satu pendekatan yang banyak digunakan adalah melalui penggunaan produk topikal seperti krim wajah yang mengandung bahan aktif

antioksidan dan stimulan regenerasi kulit [8].

Salah One tantangan of the main challenges in the development produk of antiaging products is choosing bahan active ingredients that are safe, effective, and dapat diterima widely accepted luas by consumers. Many bahan synthetic ingredients have been used, but sebagian most have raised concerns regarding efek samping long-term side effects panjang such as irritation, allergies, or toxicity. Oleh karena itu, terdapat pergeseran minat yang signifikan ke arah bahan-bahan alami yang memiliki potensi bioaktif tinggi namun minim efek samping [9].

Berbagai macam tanaman obat ternyata memiliki khasiat masing masing yang tidak kalah dengan obat-obatan kimia bahkan bisa dijadikan kosmetik [10] salah satunya yaitu tanaman daun pegagan. *Centella asiatica* (gotu kola leaves) is tanaman herbal plant that has long been used in pengobatan traditional medicine in various negara Asian countries, including Indonesia. Ekstrak daun Gotu kola leaf extract contains senyawa aktif the main active compounds such as asiatikosida, madecassoside, and asiatic acid which have been shown to have aktivitas antioxidant, anti-inflammatory activity, as well as the ability to stimulate sintesis collagen synthesis. Berbagai studi ilmiah menunjukkan bahwa ekstrak *Centella asiatica* efektif dalam memperbaiki struktur kulit, meningkatkan elastisitas, serta mempercepat proses regenerasi jaringan kulit yang rusak akibat penuaan atau paparan radikal bebas [11].

Centella asiatica is tanaman a herbal plant that has long been used in pengobatan

traditional medicine, especially in Asia. Daun pegagan mengandung senyawa aktif seperti asiaticoside, madecassoside, asiatic acid, dan madecassic acid, yang dikenal memiliki aktivitas antioksidan, antiinflamasi, dan merangsang sintesis kolagen[12].

However, the use of *Centella asiatica* as bahan an active ingredient in sediaan topical preparations such as face creams wajah still faces a number of challenges. Some di of them are the stability senyawa of the active compounds in the formulation, the penetration bahan of the active ingredients into lapisan the skin layer, and compatibility with bahan other carrier materials (vehicles). Oleh karena itu, perlu dilakukan formulasi yang tepat serta evaluasi fisik, kimia, dan biologis untuk menjamin efektivitas serta keamanan produk krim antiaging berbasis ekstrak pegagan[13].

Dalam konteks kosmetik, ekstrak *Centella asiatica* terbukti secara ilmiah mampu mengurangi kerutan, meningkatkan elastisitas kulit, dan mempercepat penyembuhan luka, sehingga cocok digunakan dalam formulasi produk antiaging[14].

The cream is sediaan a semisolid preparation that contains a mixture of water and oil, so dapat it moisturizes the skin and brings bahan the active ingredients into the layers of the epidermis. Creams are widely used as a base sediaan for cosmetic preparations due stabilitasnya yang to their good stability, daya even yang distribution and comfort when applied to the skin. Krim pemutih wajah adalah produk kosmetik kecantikan berupa krim yang memiliki kandungan campuran bahan kimia maupun

bahan lainnya yang bertujuan membuat kulit semakin cerah[15].

Sediaan krim merupakan bentuk sediaan setengah padat yang mengandung satu atau lebih bahan-bahan yang dilarutkan atau didispersikan dalam bahan dasar yang salah satunya Tanaman yang digunakan sebagai krim wajah adalah daun pegagan, karena mengandung vitamin C yang cukup tinggi dan berpotensi sebagai antioksidan yang sangat baik[16].

In the formulation of creams, the selection of emulgators, humectants, preservatives and bahan active ingredients largely determines the effectiveness and stability produk of the final product. Oleh karena itu, setiap komponen harus dipilih berdasarkan karakteristik fisikokimia dan kompatibilitasnya[17].

Beberapa penelitian menunjukkan bahwa ekstrak *Centella asiatica* mampu meningkatkan produksi kolagen tipe I dan III pada fibroblas kulit manusia, serta menekan enzim yang merusak matriks kulit seperti elastase dan kolagenase [18]. Efek This effect memberikan contributes to increased firmness and elasticity of the skin.

Selain In addition, aktivitas the antioxidant activity of *Centella asiatica* helps fight stres oxidative stress due radikal to free radicals that are penyebab the main cause penuaan of skin aging. Senyawa triterpenoid di dalamnya bekerja dengan menstabilkan membran sel dan memperbaiki jaringan kulit yang rusak[19].

Various penelitian previous studies have highlighted the potential of *Centella asiatica* in the world of cosmetics and dermatology, especially through the content senyawa of active compounds that are antioxidants and stimulan regenerasi skin

regeneration stimulants. However, sebagian most such studies are still limited to in uji vitro tests or the observation efek of pharmacological effects without regard to the formulation sediaan topikal of an applicative topical preparation . Misalnya, penelitian [19] membuktikan stimulasi kolagen oleh asiaticoside, tetapi belum menyentuh aspek kestabilan dan kenyamanan penggunaannya dalam bentuk krim wajah. Di sisi lain, studi lokal seperti oleh [20] telah mencoba merancang krim berbasis herbal, tetapi tidak secara spesifik menggunakan *Centella asiatica* sebagai bahan utama, serta belum menguji aktivitas biologis yang mendalam terhadap penuaan kulit. This condition ini reflects the kesenjangan research gap , namely the need kajian for a comprehensive study that integrates the selection bahan aktif of herbal active ingredients, formulasi kosmetik yang stable and aesthetic cosmetic formulations, and evaluasi bioaktivitas systematic bioactivity evaluation.

Based telaah on this critical review , the research gap that can be identified is that there is kajian no comprehensive study that not only evaluates efek the antiaging effect of *Centella asiatica*, but also tests kestabilan the physical stability and effectiveness formulasi of cream formulations with variations konsentrasi bahan in active ingredient concentrations. This research is expected dapat to fill the gap tersebut with pendekatan yang a comprehensive approach, combining aspects of formulation, evaluasi physical evaluation, and testing aktivitas of antioxidant and enzymatic activity as indikator biological indicators penuaan of skin aging.

This study is here to answer these needs tersebut through pendekatan yang a more comprehensive approach. Not only formulated krim face cream with various concentrations ekstrak daun of Gotu Kola leaf extract, this study ini also evaluated aspek the physical aspects, stability, and aktivitas biological activity of its antiaging. Dengan Thus, this research is expected dapat to make kontribusi a real contribution to the development ilmu kosmetika of herbal-based cosmetics science , as well as offering an alternative formulasi to natural formulations that are effective, safe, and highly competitive tinggi to be applied in sektor the industrial sector and layanan kesehatan public skin health services .

The purpose of this study ini was to formulate and evaluate the preparation krim wajah of antiaging face cream based ekstrak on gotu kola leaf extract pegagan (*Centella asiatica*) with konsentrasi yang varying concentrations (1%, 3%, and 5%). Penelitian This study secara specifically aimed to assess kestabilan the physical stability of the cream, measure aktivitas the antioxidant activity and the ability of the cream dalam to inhibit the enzyme elastase and collagenase, and determine the formula with efektivitas antiaging the best antiaging effectiveness that deserves to be developed into produk kosmetik a natural cosmetic product.

METODE RESEARCH METHODS

iii this study ini used metode eksperimental laboratory experimental methods to formulate and evaluate krim wajah antiaging face cream yang formulated with ekstrak ethanolic daun extract of *Centella asiatica* leaves in three konsentrasi different

Formula	Konsentrasi ekstrak	Color Cream	odor	texture
F1	1%	Putih yellowish white	Herbal light Herbal	soft, homogeneous
F2	3%	Kuning light yellow	Herbal strong Herbal	soft, homogeneous
F3	5%	It's more yellow more intense yellow	Herbal strong Herbal	soft, homogeneous

concentrations, namely 1%, 3%, and 5%.

Prosedur The research procedure includes the extraction bahan of active ingredients using metode maceration method with pelarut etanol 70% ethanol solvent, formulasi formulation krim tipe of emulsion cream type oil in water (M/A), and evaluation of karakteristik the physical characteristics and aktivitas biological activity of each formula. The process of making the cream is done through pemanasan separate heating between fase the oil phase and fase the water phase until the temperature reaches 70°C, then the two phases dicampurkan secara are gradually mixed while homogenizing. After the temperature of the mixture drops to 40°C,

gotu kola leaf extract pegagan is added according konsentrasi yang telah to a predetermined concentration and stirred until evenly distributed. Evaluation dilakukan was conducted on the parameter physical parameters of the cream such as pH, viscosity, daya dispersibility, and daya adhesion, as dilakukan well as testing aktivitas of antioxidant activity and inhibition enzim of elastase and collagenase enzymes as indicators efektivitas of antiaging effectiveness. All stages of the study were carried out in laboratorium pharmaceutical and cosmetic laboratories with standard procedures for testing sediaan topical preparations.

Tools and materials

iii the tools yang used in this research ini include timbangan analitik digital analytical scales for weighing materials, homogenizers for proses emulsion processes, pH meter digital pH meters for measuring the acidity of preparations, viskosimeter Brookfield viscosimeters for analisis viscosity analysis, alat uji dispersion test equipment sebar (glass plates and loads), alat uji adhesion test equipment , rotary evaporators for evaporation pelarut of extract solvents, spektrofotometer UV-Vis spectrophotometer for pengujian aktivitas antioxidant activity testing, as well as incubator and sentrifuge centrifuge to support uji stability test and analisis biological analysis.

iii ingredients yang used antara include ethanolic extract of etanolik daun Centella asiatica leaves, minyak olive oil, asam stearic acid, alkohol cetyl alcohol, glycerin, aquadest, tween 80 and span 80 as an emulgator, and methylparaben as a

preservative. Selain In addition, digunakan pula reagents for uji DPPH (1,1-diphenyl-2-picrylhydrazyl), substrat elastase substrates, and collagenase substrates are also used kolagenase as bahan uji biological assays.

Results

Formulasi Cream formulations made with varying concentrations ekstrak of Centella asiatica extract of 1%, 3%, and 5%. Hasil Evaluation results show:

the entire formula exhibits penampilan organoleptik a stable organoleptic appearance , with no adanya pemisahan phase separation or perubahan bau notable odor changes during 28 days of storage.

Formula	IC ₅₀ (ppm)
F1	85
F2	62
F3	48

The higher the concentration ekstrak of Centella asiatica extract, the stronger aktivitas its antioxidant activity, indicated by nilai IC₅₀ yang the lower value of IC₅₀. IC₅₀ Formula F3 (48 ppm) menunjukkan potensi menangkal radikal bebas, yang berkontribusi terhadap pencegahan penuaan dini [21].

Discussion

Centella asiatica is known to be rich akan komponen in active components such as asiaticoside, madecassoside, and asiatic acid, which act as antioxidants and stimulators produksi of collagen production. Hal ini mendukung hasil penelitian bahwa formulasi dengan konsentrasi ekstrak lebih tinggi memberikan efek perlindungan antiaging lebih baik [22].

These Data ini are in line with literatur previous literature that states that Centella

asiatica is able to increase the expression gen of Collagen Type I and III genes, and has sifat anti-inflammatory properties that support perbaikan jaringan skin tissue repair.

Formulasi krim Face cream formulations based ekstrak daun on gotu kola leaf extract proved effective dari in terms of stabilitas physical stability and aktivitas biological activity antiaging. The cream with konsentrasi ekstrak 5% extract concentration (Formula F3) gives hasil terbaik secara the best overall results and the potential to be developed as produk kosmetik a natural antiaging cosmetic product.

The manufacture of a cream with ekstrak Centella asiatica extract succeeded in producing sediaan topikal yang a stable, homogeneous and aesthetically pleasing topical preparation. Stabilitas Physical stability (color, odor, texture) indicates that the formulation is suitable for aplikasi kosmetik modern cosmetic applications. The addition ekstrak of up to 5% extract does not cause ketidakstabilan phase instability.

The formulation krim of the face cream with ekstrak daun Centella asiatica leaf extract shows hasil yang promising results in the aspect stabilitas of physical stability and aktivitas biological activity. i the entire formula of the cream, with konsentrasi extract concentrations of 1%, 3% and 5%, has karakteristik fisik stable physical characteristics stabil during periode the storage period, without terjadi pemisahan phase separation or significant changes in color and odor yang . i Hal this indicates that sistem the emulsion system yang used

successfully forms krim yang a homogeneous and stable cream.

Pengukuran The pH measurement shows that the entire formula is within the rentang safe range for kulit facial skin, which is between 5.1 to 5.6. this pH assessment is in accordance with kondisi the physiological condition kulit of human skin, so dapat as to minimize the risk of irritation or disruption fungsi of the protective function of the skin. this pH ini instability also reflects that the formulation does not undergo reaksi kimia significant chemical reactions signifikan during storage.

The viscosity of the cream shows a slight decrease after penyimpanan selama 28 days of storage, however, it is still within batas yang dapat diterima cosmetically acceptable limits. this decrease is generally caused by the influence suhu of ambient temperature and time, but does not cause damage to the struktur emulsion structure. formulas with konsentrasi ekstrak higher extract concentrations tinggi tend to have viskositas slightly lebih higher viscosities due to the contribution senyawa of the active compound to the density of the system.[23]

Uji daya The dispersibility test showed that creams with konsentrasi ekstrak a low extract concentration (1%) had daya sebar a higher dispersibility tinggi than formula other formulas. good diffusivity yang baik facilitates the application of the cream and the distribution bahan of active ingredients on permukaan the skin surface. however, nilai daya sebar yang the slightly Decreased dispersion value in formula konsentrasi the 5% concentration formula masih is still

acceptable, and is actually offset by an increase daya in adhesion. good adhesion yang baik force allows the cream to last lebih longer on the surface of the skin, thereby prolonging waktu the contact time bahan of the active ingredient with jaringan the target tissue.

The results uji aktivitas of the antioxidant activity test using metode the DPPH method showed that the higher the concentration of the ekstrak yang used, the stronger the ability of the cream dalam to ward radikal off free radicals. iHal ini this is evidenced by the decreasing value of IC_{50} of each formula, with a formula of 5% Showed aktivitas antioksidan very strong antioxidant activity. iSenyawa aktif seperti asiaticosida, madecassoside, dan asiatic acid diketahui memiliki gugus fenolik yang mampu menyumbangkan elektron untuk menetralkan radikal bebas, sehingga memperlambat proses penuaan kulit[24].

Selain In addition, the results uji of inhibition tests of the enzymes elastase and collagenase support temuan the previous findings. iFormula with konsentrasi ekstrak 5% extract concentration is able menghambat to significantly inhibit the activity of elastase and collagenase enzymes secara. i these two enzymes are bertanggung responsible for the degradation serat of elastin and collagen fibers in jaringan the dermis tissue, which is penyebab the main cause of the appearance of wrinkles and loss kekencangan of skin firmness. i inhibition of these two enzymes ini suggests that the cream not only works as an antioxidant, but also has potential as agen a protective agent against struktur skin structures.[25][1] T. S.

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Secara Overall, formulasi the cream formulation with ekstrak daun Centella asiatica leaf extract showed performa the best performance at a concentration of 5%. iKrim this iKrim not only meets the aspects stabilitas of physical stability and kenyamanan wearing comfort, but also shows potensi farmakologis high pharmacological potential tinggi in preventing penuaan skin aging. iHasil ini selaras dengan temuan sebelumnya oleh [26], dan [27], which confirms the role of triterpenoids in memperbaiki tissue repair and inhibition of enzymes damaging the structure of the skin.

Dengan Thus, formulasi krim this cream formulation has the potential dikembangkan lebih to be further developed into produk kosmetik berbasis herbal yang a safe, effective and competitive herbal-based cosmetic product kompetitif in the market. iSelain mengangkat kekayaan hayati lokal, penggunaan bahan alami seperti Centella asiatica juga mendukung tren penggunaan kosmetik ramah kulit dan minim efek samping [28]. iPenelitian this research also opens up opportunities for the development krim of similar creams with a combination bahan aktif of other herbal active ingredients lain that have synergies in perawatan kulit natural skin care

Conclusion

Based hasil on research results, *Centella asiatica* has potensi great potential

as bahan an active ingredient in formulasi krim antiaging face cream formulations . Ekstrak Ethanolic daun extract of Gotu Kola leaves contains senyawa bioactive compounds such as asiaticosida, madecassoside, and asiatic acid which are proven to have aktivitas antioksidan high antioxidant activity and are able to stimulate sintesis collagen synthesis, making it effective in slowing proses the aging process of the skin. Formulasi Cream formulations with three variations konsentrasi in extract concentrations (1%, 3%, and 5%) produce sediaan topical preparations that are stable, homogeneous, and have karakteristik organoleptic characteristics yang suitable for aplikasi cosmetic applications. Evaluasi The physical evaluation showed that the entire formula has a pH yang corresponding to the kondisi physiological condition of the skin (5.1–5.6), viskositas yang stable viscosity, and optimal dispersibility and daya adhesion yang . The Formula with konsentrasi ekstrak 5% extract concentration (F3) showed performa the best overall performance, both dari in terms of stability and efektivitas biological effectiveness, with an IC_{50} value IC_{50} of 48 ppm yang indicating aktivitas antioksidan very strong antioxidant activity. Selain In addition, this formula ini also shows kemampuan a high ability dalam to inhibit the enzymes elastase and collagenase, which are indikator the main indicators in proses the aging process of the skin.

Sistem emulsi The oil in water (M/A) emulsion system yang used proved to be able to distribute the extract dengan well and maintain the stability of the preparation during storage. With these

results , krim wajah berbasis *Centella asiatica*-based face creams not only meet the requirements stabilitas of physical stability and kenyamanan wearing comfort, but also show potensi farmakologis high pharmacological potential tinggi as agen antiaging a natural antiaging agent. This research ini fills celah ilmiah an existing scientific gap , namely the need akan formulasi herbal yang for stable, safe, and effective herbal formulations in bentuk sediaan topical dosage forms, while supporting the development kosmetik of local cosmetics based tanaman obat on Indonesian medicinal plants that are competitive and ramah skin-friendly.

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