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Natural Soap To Boost The Body's Immunity From Gentle Leaves

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ABSTRACT

This research aims to analyze the effect of variations in the concentration of gotu kola leaf extract (Centellaasiatica) on the physical, chemical and functional characteristics of natural solid soap. Gotu Kola leaves are known to be rich in bioactive compounds, such as triterpenoids and flavonoids, which have potential as antioxidants, anti-inflammatories and wound healing agents. This potential makes it an attractive raw material for skin care soap formulations. This research used experimental methods by designing four solid soap formulations: control (without gotu kola leaf extract), formulation A (with 5% extract), formulation B (with 10% extract), and formulation C (with 15% extract). Parameters tested include pH, water content, hardness, foam stability and antioxidant activity. The results showed that increasing the concentration of gotu kola leaf extract significantly affected the characteristics of the soap. The formulation with the highest extract concentration (15%) shows a pH value that remains within the safe range for the skin (8.5-9.0) and a stable water content, which is important for product shelf life. In addition, this formulation also showed increased hardness and better foam stability compared to the control. Adding gotu kola leaf extract at a concentration of 15% produces a natural solid soap that provides the benefits of increasing body endurance, increasing cell regeneration, reducing signs of aging and maintaining skin without negative effects.

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INTRODUCTION

Gotu kola (Centella asiatica) is a climbing herb commonly found in tropical and subtropical regions, including Indonesia. Gotu kola belongs to the Apiaceae family, with over 3,700 species across 434 genera (Sodik, 2025). Gotu kola contains various highly beneficial bioactive compounds, such as asiaticoside, which can stimulate collagen formation and accelerate wound healing (Pradnya, 2023). Unfortunately, public awareness of the benefits of gotu kola remains very low. Many consider this plant a weed with no economic value, so it is allowed to grow wild without being fully utilized. A lack of information and education about the benefits of gotu kola is one of the main reasons for this plant's lack of attention. Yet, gotu kola has great potential to be developed as a raw material for various health and beauty products, including in the rapidly growing herbal industry.

Making natural soap from gotu kola leaves is an innovation that answers the need for safe and environmentally friendly skin care products. Currently, many commercial soaps contain

synthetic chemicals that can cause skin irritation and long-term side effects (Sylvia, 2021). Public awareness of skin health and natural products is increasing, opening up research opportunities to develop soap based on herbal ingredients. Gotu Kola leaves (Centella asiatica) are widely known as a medicinal plant with various benefits, especially in wound healing and skin care, so its potential needs to be explored further as a main ingredient in making soap (Sutardi, 2016).

Common skin health issues, such as irritation, allergies, and premature aging, demand safer alternatives. Previous research has shown that gotu kola leaves contain active compounds like asiaticoside, madecassoside, and flavonoids, which have antioxidant and anti-inflammatory properties (Yulianti, 2019 However, its use in the form of natural soap is still limited and has received insufficient research attention. This indicates a significant gap that needs to be filled through research focused on natural soap formulations from gotu kola leaves as a skin care solution.

Globally, the trend of using herbal products in cosmetics and skin care continues to increase along with advances in science and technology for extracting natural ingredients. Research on herbal soaps containing active ingredients from local plants is highly relevant, especially in the context of local communities and wisdom. The development of gotu kola leaf soap can make a significant contribution not only to the cosmetic sector but also to the empowerment of natural resources and the local economy. Therefore, this situational analysis provides a strong basis for investigating the potential of gotu kola leaves in natural soap applications.

Researchers Caniago and Yunus from Prima Indonesia University have studied the benefits of gotu kola leaves in the pharmaceutical and cosmetic fields, for example in the form of topical extracts for wound healing and reducing inflammation (Caniago, 2025). Inflammation serves as a very important defense mechanism to protect the body from further damage and initiate the tissue repair process (Sulastri, 2026). However, such research is often limited to the direct application of extracts without optimizing the formulation method for stable and effective soap products. This research offers a novel approach by applying natural soap formulation technology that integrates the bioactive ingredients of gotu kola leaves to enhance the effectiveness and safety of the resulting skincare products (Billi, 2024).

Another novelty lies in the soap-making process, which prioritizes environmentally friendly principles and is free from harmful synthetic chemicals. Furthermore, this research aims to optimize the active compounds in gotu kola leaves so they can function optimally in providing benefits to the skin, such as increasing cell regeneration and reducing signs of aging. This differs from previous research that focused on pure extracts without soap formulations. Therefore, the added value of this research is the creation of a ready-to-use product with guaranteed shelf life and functionality.

This literature review confirms that the use of gotu kola leaves in natural soap has not been studied in an integrated and comprehensive manner, especially in terms of formulation, effectiveness testing and product characterization. Most previous studies have focused on clinical trials of non-specific extracts or generic products. This research makes an important contribution by including aspects of chemistry, pharmacology and innovative soap making technology. With this approach, it is hoped that it can meet consumer needs for herbal-based products with quality and benefits that can be scientifically justified.

The primary objective of this research is to develop a natural soap formulated from gotu kola leaf extract with optimal quality and tangible benefits for the skin. Furthermore, this research aims to characterize the physical and chemical properties and biological activity of the formulated soap to demonstrate its benefits and safety. This research is expected to lead to innovations in effective, safe, and sustainable skin care products, while also strengthening the potential for utilizing local natural resources that have not yet been optimized.

The significance and benefits of this research lie in its contribution to the field of herbal cosmetics, which is increasingly needed by modern society. This natural soap product based on gotu kola leaves can be a natural alternative for maintaining healthy skin without negative side effects. Furthermore, the urgency of this research arises from the need for skin care products that align with the principles of poverty alleviation, are environmentally friendly, and support the empowerment of local resources. Therefore, the results of this research are expected to not only provide scientific value but also have a positive impact on public health and environmental conservation.

METHODS

The research into the production of natural soap from gotu kola leaves used a quantitative experimental laboratory approach. This approach was chosen to obtain objective and measurable data on the quality and characteristics of the resulting soap. The experimental method allows for systematic testing of the effect of variations in gotu kola leaf extract formulations on the soap's physical and chemical parameters. This approach allows for accurate numerical and quantitative analysis, supporting the validity of the findings (Rahmi, 2023).

The research design used a comparative descriptive method by varying the concentration of gotu kola leaf extract in the soap formulation (Sandy, 2021). Then, the results of each formula were compared based on physical, chemical, and sensory testing. For example, pH, viscosity, homogeneity, foam height, and hedonic tests were conducted to determine the stability and quality of the soap. This design clarified the experimental approach by comparing several different formulas, thus determining the optimal formula for the final product (Nuryati, 2021).

Instruments used in research include analytical scales, pH meters, viscometers, laboratory glassware, soap molds, and organoleptic testing equipment. The soap making procedure begins with extracting gotu kola leaves using the maceration method with ethanol solvent, then soap formulation with the addition of extract content at several concentrations according to plan. Tests are carried out regularly to measure soap characteristics such as pH, viscosity, as well as skin irritation tests to ensure product safety (Rahmi, 2023; Nuryati, 2021).

The data obtained was analyzed using descriptive statistics to present average values, standard deviations and comparative tests between formulas. Comparative analysis is carried out using the ANOVA test or other relevant tests to determine whether the influence of the variables in the research is significant or not. This analysis technique helps interpret quantitative data so that the optimal soap formula can be found based on the resulting physical and sensory parameters.

RESULTS AND DISCUSSION

Natural soap made from Centella asiatica leaf extract shows great potential as a safe and effective skin care product. This study aimed to characterize soaps with varying concentrations of Centella asiatica extract as the active ingredient, which contains saponins, flavonoids, tannins, and triterpenoids that function as antioxidants and antibacterials (Arumugam, 2011). Air content, pH, free fatty acids, and foam stability are the main physical parameters tested to determine soap quality.

The characterization results of solid soap showed an air content ranging from 3.82% to 4.47%, a pH of 9.03 to 9.38, free fatty acids of 2.18% to 4.51%, and foam stability of 93.2% to 95.8%. These values indicate the soap has good cleaning properties and a stable formulation (Rahmi, 2023). Meanwhile, the hedonic test revealed that panelists preferred soap with a centella asiatica extract concentration of 0.2-0.3 grams in terms of color, aroma, and texture, which indicates positive consumer acceptance (Rahmi, 2023).

The correlation between the research findings and the underlying theory is that the saponin content in gotu kola leaves acts as an effective natural surfactant, while flavonoids and tannins act as antioxidants that protect the skin from free radicals. Therefore, the use of gotu kola leaf extract not only provides a cleansing effect but also promotes healthy skin care.

Table 1. Contents of Gotu Kola Leaf Extract Soap

No	Parameter	Range of values	Reference standard	Information
1	Water content (%)	3,82-4,47	<5% (INS)	Low water content, dry soap
2	pH	9,03- 9,38	9-10 (INS)	Alkaline according to soap
3	Free fatty acids	2,18 – 4,51	<5%	Fatty acid levels are within safe limits
4	Foam stability	93,2 – 95,8	>90%	Stable and durable foam

(Test result data and INS standards processed from (Rahmi, 2023).

Analisis Keterkaitan dan Sinkronisi

The data obtained were analyzed using descriptive statistics to present the average value, standard deviation, and comparative testing between formulas. Comparative analysis was conducted using ANOVA or other relevant tests to determine the significance of the variables in the study. This analysis technique helps interpret quantitative data so that the optimal soap formula can be found based on the resulting physical and sensory parameters..

This research provides a significant contribution to the development of a natural soap that not only effectively cleanses but also provides skincare benefits through the bioactive ingredients of gotu kola leaves. This product has the potential to be an environmentally friendly and safe alternative for consumers, especially those who avoid synthetic chemicals. Furthermore, with positive consumer acceptance, this soap could be commercially developed, increasing the economic value of gotu kola as a natural cosmetic ingredient (Rahmi, 2023).

The soap-making process involves selecting the finest pegagan leaves, then drying them to reduce the water content. Once dry, the leaves are processed into powder. Dissolve sodium hydroxide in distilled water until neutral. Mix the natural oil and sodium solution until thick and sticky. Then, add the pegagan leaf extract. Once everything is mixed, pour it into a mold and wait for it to harden. Let it sit for approximately 3-4 weeks for the soap to harden completely before use (Widyasanti, 2017).

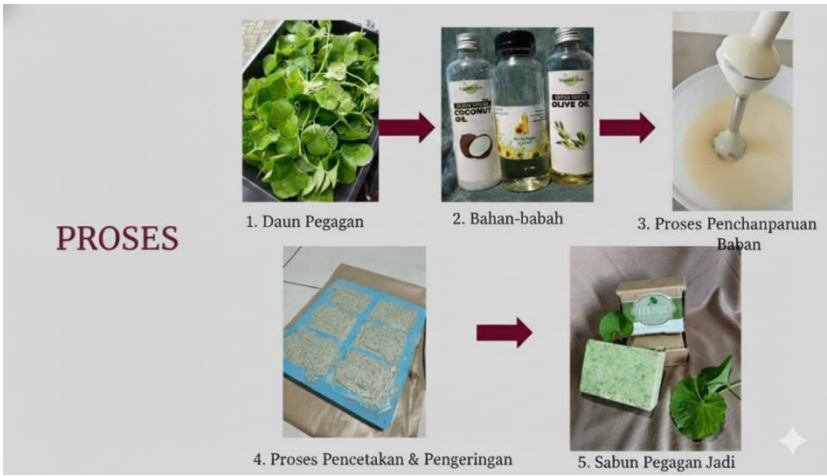

Figure 1. Soap making process

Figure 2. Finished gotu kola leaf soap

Once the soap is ready, distribution is carried out by targeting markets such as cosmetic stores, hotels, and supermarkets, supported by a distribution strategy through direct selling, local stores, and marketplaces. Marketing is carried out both offline and online, utilizing social media, influencers, and direct promotions to introduce product advantages and reach a wider consumer base.

Based on the test results, the natural solid soap produced in this study showed superior physical and chemical characteristics and met the Indonesian National Standard (Badan Standarisasi Nasional Iindonesia, 2016). Crucial parameters such as water content, pH, free fatty acids, and foam stability consistently remained within safe and stable ranges. This demonstrates that the formulation is not only effective as a cleansing agent but also gentle on skin hydration and free from the risk of irritation. From a sensory perspective, through hedonic testing, soaps with varying concentrations of gotu kola extract of 0.2–0.3 grams received a very high level of acceptance from panelists. This high level of interest was driven by positive assessments of the

soap's natural color, distinctive aroma, and comfortable texture when applied. This combination of sustainable technical excellence and consumer preferences opens up promising commercial opportunities in the cosmetics market.

This research has successfully confirmed the significant potential of gotu kola (Centella asiatica) leaf extract as a functional active ingredient in soap making. The presence of bioactive compounds such as saponins, flavonoids, and triterpenoids in it not only functions as a natural cleanser but also provides additional therapeutic effects in the form of antioxidant and anti-inflammatory activities that are effective in nourishing and protecting the skin. Thus, the results of this research make a significant contribution to the innovation of safe and environmentally friendly herbal cosmetic products. In addition to being an alternative solution for people who want skin care products free from harmful synthetic chemicals, this innovation also directly increases the economic value of gotu kola plants, which have often been considered weeds.

CONCLUSION

Based on the research conducted, it can be concluded that natural soap from Centella asiatica leaf extract has been successfully formulated as a safe and effective skin care product. This research answers the initial questions and objectives, namely to develop a natural soap formulated from Centella asiatica leaf extract with optimal quality and real benefits for the skin. Furthermore, this research also aims to conduct physical and chemical characterization and biological activity tests of the formulated soap as evidence of its benefits and safety for use. This research is expected to lead to innovation in effective, safe, and sustainable skin care products, while also strengthening the potential for utilizing local natural resources that have not been optimized so far.

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