

Review article : The Possible Application of Natural Ingredients in Cosmetics for Hair Growth and Strengthening

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Received: 20 February 2024 / Accepted: 10 March 2024

ABSTRACT: Hair is the most significant aspect in supporting look, it requires regular care for problematic scalp and hair, which can be achieved by using products containing hair and scalp care chemicals. The use of natural ingredients as main raw materials and additional raw materials has long been carried out in the cosmetics industry, because they are known to be rich in nutritional content and benefits so they can be used to make beauty and hair care products. The main objective of this literature study activity is to identify the potential contained in the natural to use strengthening and regrowing on the scalp and hair. The literature study was carried out by searching national and international journal literature from 1981 to 2023 regarding natural ingredients in products, namely: lavender, peppermint, rosemary, grapeseed oil, olive oil and bidara oil. Based on literature studies, the results showed that the natural ingredients contained in the product have been proven to have the potential to regrowing, moisturize, strengthen and nourish the scalp and hair, as well as being more environmentally friendly than chemicals and safe to use.

KEYWORDS: Ingredients; natural; hair.

1. INTRODUCTION

The term cosmetics comes from the Greek word *cosmos* which means skill in decorating. According to the Regulation of the Head of the Indonesian Food and Drug Supervisory Agency (BPOM) No. 23 of 2019, cosmetics are defined as ingredients or preparations used on the outside of the human body such as the epidermis, hair, nails, lips and external genital organs, as well as teeth and oral mucous membranes, especially to clean, scent and improve body odor, change appearance, as well as protect and keep the body in good condition. Cosmetics do not have the aim of treating or preventing disease (BPOM RI, 2019). The cosmetics industry is one sector that is growing rapidly against the backdrop of ever-increasing customer demand for beauty and personal care products. The existence of innovation in product making, production processes, and trends is very influential in the cosmetics industry. The use of cosmetics helps increase self-confidence and improves the appearance of the wearer, not only women but also men. The growth of the cosmetics industry has been driven by consumer awareness about the importance of self-care in recent years.

Behind the rapid growth of the cosmetics industry, the safety and sustainability of cosmetic products is a major issue that must be considered. Due to the use of chemicals, concerns arise regarding the potential negative effects on the environment and human health. Understanding this issue can encourage awareness of the importance of using safe and sustainable cosmetic products from natural ingredients.

Hair is a special derivative structure of the skin and is one of the characteristics that define the characteristics of humans. Hair roots are buried deep under the epidermis layer of the skin and are enclosed in hair follicles. Each hair experiences a growth process through a cycle consisting of anagen, catagen and telogen phases, namely the growth, regression and resting phases. Various types of cytokines and growth hormones are believed to be involved in the regulation of the hair growth cycle. Hair has an important role in human social life and is one of human attractions. Hair loss is an unpleasant condition that is related to various factors such as genetics, medical (disease), or lack of hair nutrition [1].

One of the scalp and hair treatments is the application of hair serum after the scalp and hair have been washed. Natural cosmetic goods hair serum on the market with the goal of nourishing and strengthening hair

How to cite this article: Anarisa B, Fit IU. Review article : The Possible Application of Natural Ingredients in Cosmetics for Hair Growth and Strengthening. JNPDD. 2025; 2(2): 85-90.

contain several of the following substances: lavender; peppermint; rosemary; grapeseed oil; olive oil and bidara oil, because it includes chemicals that can stimulate and boost hair growth, and potent antioxidants.

2. MATERIALS AND METHODS

2.1. Materials

The data collection process was carried out by directly searching for reference journals, both national and international, via the Google search engine and the Google Scholar website, Research Gate. The literature study was carried out by searching national and international based journal literature on range from 1981 to 2023.

2.2. Procedure

The data used in this journal review are journals regarding the natural ingredients which is often found in cosmetics: lavender, peppermint, rosemary, grapeseed oil, olive oil, and bidara oil, which were then searched for their contents and benefits in strengthening and growing hair. The data collection process was carried out by directly searching for reference journals, both national and international, via the Google search engine and the Google Scholar website, Research Gate. The literature study was carried out by searching national and international based journal literature on range from 1981 to 2023.

3. RESULTS

Study from journals and articles that examined the natural ingredients which is often found in cosmetics: lavender, peppermint, rosemary, grapeseed oil, olive oil, and bidara oil. In these journals and articles it was found that all the natural ingredients contained have the potential to regrowing, moisturize, strengthen and nourish the scalp and hair, and are more environmentally friendly than chemicals and are safe to use.

Table 1. Summary of the properties and chemical content of natural cosmetic ingredients.

Scientific Name	Local Name (Indonesia)	Part of the plant used	Chemical compound content	Efficacy	References
<i>Lavandula angustifolia</i>	Lavender/ Lavendel	Flowers, flower stalks	linalyl acetate, linalool, and geraniol	Stimulate and promote hair growth, fatigue recovery, stress relaxation, skin reproduction, antifungal.	[2], [3], dan [4]
<i>Mentha piperita</i>	Peppermint/B ijanggut pedas	leaf	Menthol	Stimulates and promotes hair growth, anti-inflammatory, antimicrobial, antifungal, strong antioxidant activity.	[5], [6], [7], dan [8]
<i>Rosmarinus officinalis</i> L. <i>syn. Salvia rosmarinus</i>	Rosemary/R osemari	Whole plant	asam rosmarinic, fenolat, epicatechin, epigallocatechin gallate, dan asam karnosat. 1-8 cineole, camphor, alpha-pinene, beta-pinene, camphene, p-cymene, alpha-terpinene, gamma	Stimulates and improves hair growth, antioxidant, antimicrobial, anti-inflammatory and neuroprotective	[9], [10], dan [11]

			terpinene, gamma- humulene, beat- bisabolene, genaniol dan terpinolene			
<i>Vitis vinifera</i> L. ssp. sativa	Grapeseed oil/Minyak biji anggur	seed	stearic acid (6%), palmitic acid (9%), oleic acid (15%), and linoleic acid (70%).	Improves hair brightness and strength after cleaning with shampoo		[12]
<i>Olea europaea</i>	Olive oil	fruit	Oleic acid 80%, vitamin E, squalene, including carotene.	emolien		[13], [14], [15], dan [16]
<i>Ziziphus spina- christi</i> L	Bidara oil	Leaf, fruit dan seed	alkaloids, flavonoids, riboflavin, saponins, polyphenols	Hair growth		[17], [18], dan [19]

4. DISCUSSION

Lavandula angustifolia

The contents of lavender oil (LO) include linalyl acetate, linalool, and geraniol has antioxidant activity. It is known to be effective for fatigue recovery, stress relaxation, cell growth, skin reproduction, and alopecia areata [2]. Among these elements, linalyl acetate ester is effective for nerve relaxation, and as a tincture, linalool has antifungal effects [3]. Aromatherapy is an alternative treatment that is currently receiving a lot of attention.

A study was conducted on lavender oil to determine hair growth which was then applied to the backs of female mice. The results of tests carried out for 4 weeks showed that lavender oil had the effect of increasing hair growth and could be applied as a hair growth promoting agent [4].

Mentha piperita

Peppermint (*Mentha piperita*) is a plant native to Europe, extracted from peppermint leaves and has also been used in cosmetic formulations as a fragrance component. The main ingredient in peppermint oil is menthol [5]. In vitro, peppermint has been shown to exhibit strong anti-inflammatory, antimicrobial, antifungal, anti-oxidant, anti-allergic, and anti-tumor activities [6,7].

A study was conducted to determine the effect of active hair growth substances on the hair growth of mice which were divided into 4 groups which were applied with different ingredients, one of which was peppermint oil. The effect of hair growth after administration for 4 weeks, the group of mice that were applied with 3% peppermint oil experienced significantly increased hair growth results. These results suggest that 3% peppermint oil facilitates hair growth by promoting conservation of hair dermal papilla vascularization, which may contribute to the induction of the early anagen stage. Additionally, Peppermint oil effectively stimulates hair growth in animal models through several mechanisms and thus can be used as an alternative therapeutic or preventative treatment for hair loss in humans [8].

Rosmarinus officinalis L. (syn. *Salvia rosmarinus*)

Rosemary (*Rosmarinus officinalis* L.) Fam. Lamiaceae is a fragrant green herb native to the Mediterranean region and cultivated in Egypt. It is known for its ingredients, namely: rosmarinic acid, essential oils, and phenolics and their derivatives which have been applied to many pharmaceutical and cosmetic products in Ancient Egypt. These metabolites have also been shown to have antioxidant, antimicrobial, anti-inflammatory, neuroprotective, and antidiabetic properties. Four phenolic antioxidants found in tea and rosemary extracts (epicatechin, epigallocatechin gallate, rosmarinic and carnosic acids) were investigated. LC-MS data showed the formation of hydroxylated derivatives, quinones and hydroperoxides from antioxidants. The assignment structure was aided by deuterium exchange experiments [9].

Research has been carried out to formulate an oleogel containing two essential oils (Cedarwood and Rosemary) singly and in combination. and evaluating the effects of increasing hair growth in animal models. Oleogel is formed using beeswax as an organogelator with a concentration of 10% for oil when used alone or 5% for each oil when formulated in combination. Oleogel characterization was carried out using spreadability, oil binding capacity (OBC), gas chromatography (GC) and differential scanning calorimetry (DSC). Hair growth evaluation was carried out on 18 albino mice in six groups consisting of three people. Hair removal cream was applied to the experimental animals and Oleogel was applied for six weeks. GC analysis of the oil shows that rosemary oil contains 1-8 cineole, camphor, alpha-pinene, beta-pinene, camphene, p-cymene, alpha-terpinene, gamma terpinene, gamma-humulene, beta-bisabolene, geniol and terpinolene. The results of hair growth evaluation on the oleogel formula containing 10% rosemary oil had the same effect as the positive control (Minoxidil 2%) at the end of the six week period [10].

In another study, a hair lotion formulation containing 1% rosemary combined with *R. officinalis* methanol extract was tested for hair growth activity in C57BL/6 mice, using water as a control and 2% minoxidil hair lotion as a standard. The results obtained from the research were: 1% herbal hair lotion showed significant hair growth increasing activity compared to animals given standard medication. This formula can be considered as a safe alternative to promote hair growth [11].

***Vitis vinifera* L. ssp. Sativa**

Grape seed oil contains stearic acid (6%), palmitic acid (9%), oleic acid (15%), and linoleic acid (70%). In a study conducted with the aim of comparing the efficacy of herbal oils, namely: safflower seed oil, grape seed oil, and rosehip oil on 3 types of hair, namely, natural (unprocessed), damaged hair and colored hair. The method is carried out on hair samples that have been washed with basic shampoo, then herbal oil is applied, and analyzed regarding brightness, color changes, elasticity and hair breakage points. This is done to regain the reduced efficacy due to applying shampoo to the hair with the oil applied. Grape seed oil provides the best results compared to other oils in terms of hair shine and hair strengthening on all hair types. The most positive effect was achieved with grape seed oil, then rosehip oil and safflower seed oil [12].

Olea europaea

Pure olive oil is oil that is extracted from the fruit of the olive tree (*Olea europaea* L.) physically or mechanically at a certain temperature which will not change the quality of the oil preparation. Olive oil is only processed through washing, decantation, centrifugation, and filtration [13]. The use of olive oil in cosmetic products as a solvent and moisturizer for skin and hair is due to its rich content of minerals, nutrients, antioxidants and vitamin E. The resulting effects make it possible to increase the absorption of the substances carried. Apart from that, there are many additional ingredients in olive oil including hydrocarbons, such as squalene which functions as a lubricant and smoother, beta-carotene and tocopherol which can help maintain skin elasticity, and sterols which can maintain collagen flexibility [14]. Olive oil can be used as an emollient because it contains oleic acid as a major or high content in the product.

Based on its properties, oleic acid can maintain skin moisture, flexibility and smoothness [15]. Various types of olive oil products have been widely used by the public, both in the fields of beauty and health. The high oleic acid content, which is around 80%, makes olive oil have the potential to have the function of moisturizing and smoothing the skin. Moisturizing cosmetics are cosmetics that are used to repair dry skin and protect skin hydration. Based on research by Oktavia AD in 2021 in the first journal, table 1, olive oil can be used as an emollient in moisturizing products [16].

***Ziziphus spina-christi* L.**

Bidara or widara (*Ziziphus spina-christi* L.) grows in Indonesia. The chemical compounds contained in Arabic bidara leaves include alkaloids, phenols, flavonoids and terpenoids [17]. *Ziziphus spina-christi* L. is thought to have potential as a hair growth, just like other bidara species. Apart from that, *Ziziphus spina-christi* L. can also be used as a shampoo by first boiling it for a certain amount of time [18].

The content of Arabian bidara leaves (*Ziziphus spina-christi* L.) as a hair fertilizer compared to chemical compounds from other plants from the genus *Zizipus*, has the potential to be a hair growth because it contains chemical compounds including alkaloids, flavonoids, riboflavin, saponins, polyphenols.

Many plants have been researched as hair fertilizers and have a variety of different active compounds, some of these compounds are also found in the *Ziziphus spina-christi* L. plant, each compound certainly has its own activity, such as vitamins and minerals which are able to widen hair follicles so that the hair becomes

thick and strong, then the active alkaloids function as irritants which are able to enlarge the hair follicles so that the nutrients needed by the hair will increase [19].

5. CONCLUSION

Based on literature studies, it was found that the natural ingredients contained in the hair serum have been proven to have the potential to nourish the scalp, nourish and strengthen hair by showing a significant increase in the number of hair follicles, deeper hair follicle depth, thickening of the dermal layer, and facilitating hair growth by encouraging the conservation of vascularization of the dermal hair papilla, which can contribute to the induction of the early anagen stage (lavender, peppermint, rosemary, arabic bidara), healthy and shiny hair after administration of shampoo (grape seed oil), moisturizes (olive oil), and is more environmentally friendly than chemicals and safe to use.

Acknowledgements: First and foremost, we would like to sincerely thank the Faculty of Pharmacy of Pancasila University and the Faculty of Sains and Technology and PT. Zahara Natural International for their support and direction during this project.

Author contributions: Concept – A.B.; F.I.I.U.; Design – A.B.; F.I.I.U.; Supervision – A.B.; F.I.I.U.; Resources – A.B.; F.I.I.U.; Data Collection and/or Processing – A.B.; F.I.I.U.; Analysis and/or Interpretation – A.B.; F.I.I.U.; Literature Search – A.B.; F.I.I.U.; Writing – A.B.; F.I.I.U.; Critical Reviews – A.B.; F.I.I.U.

Conflict of interest statement: The authors declared no conflict of interest in the manuscript.

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