



ROLE ESSENTIAL OILS IN HAIR GROWTH

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Abstract

The use of essential oils is increasingly in demand, both for health and as cosmetic ingredients. Essential oils contain various bioactive components which play a role in stimulating hair growth. This research reviews the effectiveness of several essential oils, such as peppermint, zizyphus jujuba, lavender, and platycladus orientalis in stimulating hair growth based on in vivo studies. The research results show that topical application of essential oils can accelerate the transition to the anagen phase, increase the vascularization of the dermis papillae, and improve the structure of hair follicles. Peppermint oil has been proven to significantly increase hair thickness and length. Zizyphus jujuba oil increases the number of hair follicles in the anagen phase. Lavender oil contributes to reducing hair loss and increasing hair thickness. Meanwhile, platycladus orientalis oil shows a positive effect on hair length and weight, thought to be due to its cedrol content. Although essential oils show great potential as natural hair growth agents, more research is needed to understand their mechanism of action in depth. This study provides insight into the use of essential oils as a natural alternative in hair care, taking into account the safety and effectiveness aspects of their use.

Keywords: *Essential Oils, Hair Growth, Bioactive*

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INTRODUCTION

Hair loss (*hair loss*) occurs in many people, so it can reduce the function of cosmetics and their protection of the body and head from the environment. This is not life threatening, but it affects self-confidence and can even be a psychological stressor (Rasman et al, 2019) (Horev, 2018).

Currently only two drugs are approved by the FDA for the treatment of AGA. One of which is *potassium channel opener* which is better known as minoxidil and the dihydrotestosterone synthesis inhibitor drug which is better known as finasteride. In recent years various plant extracts or their bioactive components have been evaluated for their potential to increase hair growth (Horev, 2018) (Shin et al, 2019).

Essential oil This is a natural source of biologically active ingredients and can also be widely applied both medically and for aromatherapy. *Essential oil* It is also starting to be widely used for hair health purposes. Its various benefits include balancing sebum on the scalp, reducing hair loss, and stimulating hair growth (Abelan et al, 2021).

In several studies giving *essential oil* Topical has been proven to significantly increase hair length and hair follicle diameter despite being easy to apply daily. Although research regarding *essential oil* This is still limited, but this is quite promising considering that there have been several studies that have tried to examine the efficacy *essential oil* This is in hair growth and is quite promising from the research results obtained. Around 1000 types of plant extracts have been examined which are related to hair growth and will continue to develop in various segments and wide coverage in the coming years (Lubbe et al, 2011) (Towaha et al, 2018) (Al-Reza et al, 2010). But only 4 kinds *essential oil* which will be discussed in this paper include: (*peppermint oil*, *zyziphus jujube oil*, *lavender oil*, *platycladus oil*) considering that in vivo research has been carried out and it has been proven to be successful in growing hair significantly.

The main characteristics that consumers desire in the hair care category are natural ingredients, plant-based ingredients, and claims of being 'free from' components considered harmful to the skin (Shin et al, 2019). According to reports *Grand View Research*, the global market for organic products is expected

to reach \$25.11 billion by 2025 (Abelan et al, 2021). This trend reflects that people are more concerned about environmental and health impacts (Buffoli et al, 2018).

METHOD

The research methods in this paper mainly focus on in vivo studies to evaluate the effects of several essential oils on hair growth. The research was carried out on mice whose back hair was shaved to induce the telogen phase. Essential oils, such as peppermint, lavender, *Zizyphus jujuba*, and *Platycladus orientalis*, are applied topically in certain concentrations, then changes in hair growth are observed over a certain period. Parameters measured include hair length, number and depth of hair follicles, and dermis thickness. The results showed that essential oil application could accelerate the transition to the anagen phase, increase dermal papilla vascularization, and improve hair follicle structure compared to controls. Histological analysis and additional measurements were also used to identify the specific bioactive activity of each essential oil.

RESULTS AND DISCUSSIONS

Various Roles *Essential Oil* for hair growth.

A. *Peppermint oil (Mentha piperita)*

Essential oil peppermint consists of several components including, menthol, mentholene, menthyl-acetate, 1,8-cineole, menthofurane, neomenthol, isomenthone, beta-caryophyllene, germacrene D, limonene, beta-pinene, terpinene-4-ol, and alpha-pinene. Menthol is the main ingredient of *essential oil peppermint*, which is a cyclic alcohol. Several studies show that *essential oil peppermint* Can trigger hair to become thick and long when used topically. In an in vivo study conducted on C57BL/6 mice, the mice were divided into 4 groups based on topical therapy, each of which was given topical (saline, *jojoba oil*, 3% minoxidil, 3% *peppermint oil*). Evaluated within 4 weeks by histological analysis, enzyme activity *alkaline phosphatase* and insulin like growth factor-1 gene expression. The group that uses it *peppermint oil* shows the best hair growth effect, significant increase in dermal thickness, number of follicles and depth of follicles. *Essential oil peppermint* can increase the elongation of hair follicles from the epidermis to the subcutis and increase the vascularization of the hair dermis papilla and trigger the anagen phase (Oh Jy et al, 2015).

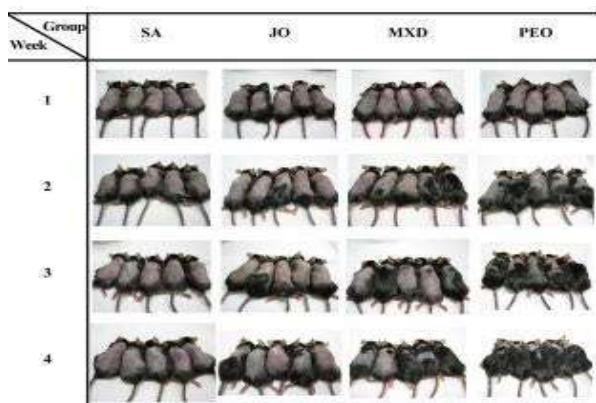


Figure 1. The back hair of C57BL/6 mice was shaved and divided into 4 groups based on the topical application given. (Saline, Jogoba Oil, Minoxidil, Peppermint oil) and evaluated within 4 weeks. (Oh Jy et al, 2015)

B. Ziziphus Jujuba oil

Ziziphus jujube is a rhamnaceous plant that is widely found in Europe and Southeast Asia. In in vivo research conducted by Ji Yoon et al. This research was conducted to test the effect *essential oil* from seeds *Ziziphus jujube* for hair growth. *Essential oil* applied at different concentrations (0.1%, 1% and 10%) over shaved skin on the backs of BALB/c mice and monitored for 21 days. After 21 days, mice treated with 1% and 10% oil produced a greater effect on hair length measured at 9.96 mm and 10.02 mm, respectively, compared to controls (8.94 mm). Ji Yoon et al measured hair weight/cm² on the back skin area and also evaluated hair thickness and hair follicles microscopically. The best results were found for 1% of mice given essential oils. From this research, it was concluded that *Z. Jujuba* has a significant hair growth effect. This research explains that the number of hair follicles is greater in the anagen phase (Lou 2020). However, the exact mechanism in this study is not yet known.



Fig. 2. Hair growth promoting effect of the *Z. jujube* essential oil on BALB/c mice after 21 days. A: naturally shaved skin of mouse; B: no treatment; C: treated with 0.1% (*Ziziphus jujube* essential oil); and D: treated with 10% (*Ziziphus jujube* essential oil).

Figure 2. The hair on the backs of C57BL/6 mice was shaved, then divided into 3 groups. (group B: without any topical administration), (group C: topical hydrocortisone on the left side of the mouse's back and 0.1% ziziphus jujube oil on the right side of the mouse's back), (group D, left part 1% ziziphus jujube oil, 10% ziziphus jujube oil). (Lou, 2020)

C. Lavender Essential Oil

Essential oil Lavender has various main components, including linalool (26.7%), terpinene-4-ol (22.1%), and 3-carene (21.6%). Several studies say that *essential oil* Lavender can reduce hair loss and make hair stronger. Besides that, *essential oil* Lavender can also increase hair growth and hair thickness. In the in vivo research, C57BL/6 mice were divided into several groups (normal saline, *jojoba oil*, minoxidil, 3% *lavender oil*, 5% *lavender oil*) showed significant changes in the number of hair follicles, the depth of the hair follicles, and the thickening of the dermal layer in mice treated with 3% Lavender EO. *lavender oil* 5% and minoxidil compared to others. It was concluded that lavender *essential oil* This has the effect of increasing hair growth. The aim of this study was to determine the hair growth effect of lavender oil (LO) in C57BL/6 mice. Mice were divided into normal group (N: saline), control group (VC: *jojoba oil*), positive control group (PC: 3% minoxidil), experimental group 1 (E1: 3% LO), and experimental group 2 (E2: 5% LO). The test compound solution was applied to the backs of mice (100µ. L per application), once a day 5 times a week, for 4 weeks. Changes in hair follicle number, dermis thickness, and hair follicle depth were observed in skin tissue stained with hematoxylin and eosin, and mast cell numbers were measured in dermal and hypodermal layers stained with toluidine blue. minoxidil group, *lavender oil* 3% and *lavender oil* 5% showed a significant increase in the number of hair follicles, deeper hair follicle depth, and a thickened dermal layer, as well as a significant decrease in the number of mast cells compared with the N group. These results indicate that *lavender oil* has a marked hair growth enhancing effect, as observed morphologically and histologically (Miri, 2018)

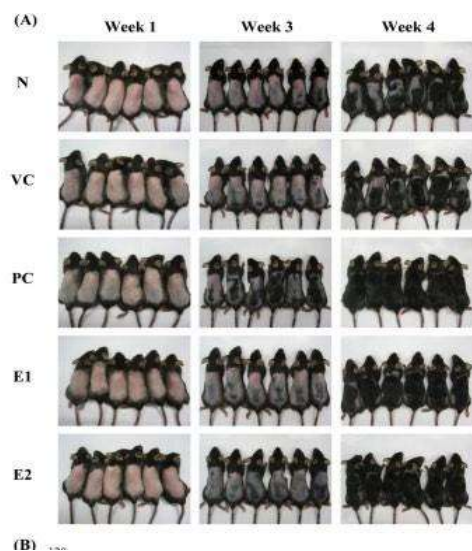


Figure 3. The back hair of C57BL/6 mice was shaved, then divided into 5 groups. (normal saline, (N), jojoba oil, minoxidil, 3% lavender oil, 5% lavender oil) N: normal saline VC: jojoba oil PC: minoxidil E1: 3% lavender oil E2: 5% lavender oil (Miri, 2018)

D. *Platycladus Orientalis* Essential Oil

Platycladus orientalis is known to improve hair growth. The main content found in *platycladus orientalis* oil also called cedrol or better known as cedarwood. However, there are no reports about its main active ingredient being responsible for hair growth activity. Different concentrations of cedrol (10, 20 and 30mg/mL) were applied to the shaved skin of C57BL/6 mice and monitored for 21 days. The results showed that cedrol significantly increased hair growth. The group of male and female mice given 30mg/mL cedrol took a shorter time compared to the control group and 2% minoxidil. Compared with the control group (8.87mm) and 2% minoxidil (9.94mm) for 21 days, the hair length of female mice given 30mg/mL cedrol showed a remarkable increase with a value of 11.07mm. The hair in the group of male and female mice given 30mg/mL cedrol was heavier than the 2% minoxidil group (38.2 and 35.9mg respectively) with a weight of 42.6 and 45.2mg respectively. Further observation of the hair follicles showed that cedrol had a remarkable effect on the length of the hair follicles. These findings suggest that cedrol may be the main active ingredient of *P. orientalis* and has potential in new hair growth (Yan et al, 2017).

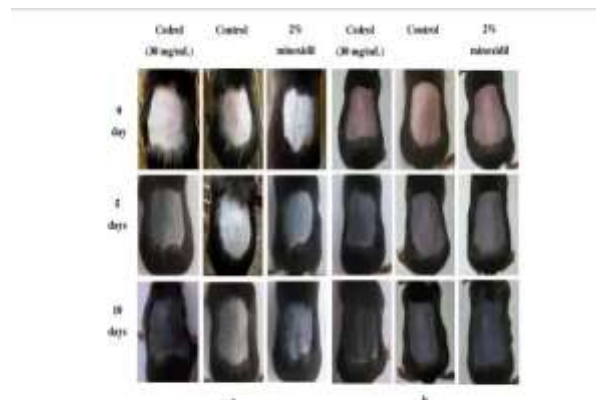


Fig. 3. Effects of topical cedrol on hair regrowth in C57BL/6 mice. In vivo hair regrowth was followed by depilating the hairs with a waxed strip and weekly old C57BL/6 mice (a, male; b, female). The hair skin were topically applied with control (30 mg/mL), 2% minoxidil or vehicle (a = 30). Photographs were taken on 0, 5, 10 days after applying control or vehicle on the shaved dorsal skin.

Figure 4 The hair on the backs of C57BL/6 mice was shaved, then the results of topical administration of 30% cedrol with 2% minoxidil were compared and observed on days 0, 5, 10. (Yan et al, 2017)

Treatment	Length of Hair follicle (µm, 21 days)	
	Male	Female
Cedrol (10 mg/mL)	69.70 ± 8.98**	77.47 ± 5.47**
Cedrol (20 mg/mL)	92.51 ± 6.09**	112.28 ± 7.17**
Cedrol (30 mg/mL)	189.14 ± 12.76***	222.23 ± 14.07***
Control	21.44 ± 4.37	28.69 ± 5.86
2% Minoxidil	143.88 ± 9.77***	152.90 ± 7.41***

Figure 5. The length of hair follicles was observed for 21 days after giving cedrol oil to female and male mice. (Yan et al, 2017)

E. *Essential Oils Circulating on the Market*

Usage *essential oil* (EO) for hair growth, can be used topically either pure without dilution or carrier ingredients. However, in general use *essential oil* Purely topically is very rare, because there is a risk of irritation, therefore a carrier agent such as: *argan oil*, *coconut oil*, *almond oil* and various other types of carrier substances. Among the essential oils that have been discussed, it is reported that only lavender oil can be applied directly topically without a carrier oil on the scalp. Most applications of this essential oil are mixed in shampoo and also *hair tonic* (Abelan et al, 2021).

CONCLUSION

Essential oil is a natural source of biologically active ingredients that can be widely applied both medically and for aromatherapy. In

general *essential oil* works by increasing the vascularization of the dermal papilla, increasing blood circulation in the hair follicles thereby stimulating hair growth. Active ingredients in *essential oil* can penetrate the scalp quickly, stimulating the growth of hair follicles.

Some studies show that some *essential oil* It can be used as a hair care product, one of which is efficacious for hair growth. Use *essential oil* For hair care in general, it is applied through other hair care products such as shampoo and also *hair tonic*. However, it can also be applied topically either purely with a carrier oil or without a carrier oil, such as *argan oil*, *coconut oil*, *almond oil*.

In this paper, only 4 types are discussed *essential oil* In hair growth, apart from in vivo research, the 4 essentials discussed in this paper are already widely available on the market.

But what needs to be noticed, not all *essential oil* This can be applied directly topically considering the side effects can irritate the scalp.

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