



ISSN: 2586-6036

JWMA website: <http://accesson.kr/jwmap>doi: <http://dx.doi.org/10.13106/jwmap.2025.Vol8.no2.33>

A Study on the Improvement Effect of Sensitive Scalp Using Shampoo with Lavender Oil

Han-Shin PARK¹, Young-Jin SO²

1. First Author, Department of Beauty Cosmetics Science College of Bio Convergence, Eulji University, Korea,
Email: hanshin24@naver.com

2. Corresponding Author Professor, Dept. of Beauty & Cosmetic Science. Science College of Bio Convergence, Eulji University, Korea, Email: yjso@eulji.ac.kr

Received: April 17, 2025. Revised: April 20, 2025. Accepted: April 23, 2025.

Abstract

Purpose: This study aims to investigate whether shampoo containing lavender essential oil has a positive effect on improving problematic scalp. **methodology:** Subjects were branded with sensitive shampoo and lavender essential oil once daily for 4 weeks in a 9:1 ratio. Measurement and evaluation were performed once a week on the areas with the most severe inflammation and erythema after product use by a scalp professional, and a Likert 5-point scale was performed on the subjects as a subjective evaluation.. **Results:** The improvement of erythema and inflammation improved from the second week, and then very much after the fourth week. The degree of sensitivity scalability was 4.09 points for overall normality, followed by inflation (M=4.56), scalp condition (M=4.33), scalp cleanness and scalp erythema (M=4.22), beating (M=3.67), and heat improvement (M=3.56) in order ($p<0.05$, $p<0.01$). **Conclusions:** Therefore, shampoo products containing lavender essential oil were found to be very effective in improving sensitive scalp.

Keywords : Sensitive scalp, Shampoo, Lavender essential oil

JEL Classification Code : I10, I11, I19

1. Introduction

Today's modern society has become a convenient living environment due to economic development and accelerated urbanization. However, due to various environmental pollution and stress the scalp is changing from a healthy scalp to a sensitive scalp(Kim, 2008). As the scalp becomes sensitive, it is important to use a shampoo that is suitable for sensitive scalp(Yang, 2010. Lee, 2013).

The scalp is exposed to secretions from the human body, such as sebum, sweat, and dead skin cells, which can cause damage to the scalp and contamination around the pores, impairing scalp breathing, blocking pores, impairing nutrient absorption, and impeding the growth of newborn

hair. It also causes bacterial growth, dandruff, and erythema inflammation, leading to loss of scalp and hair function and hair loss (Kim, 2005.Ryu, 2008).

Natural essential oils have various chemical components, which have antibacterial properties against bacteria and viruses and relieve various skin-related diseases, such as skin inflammation and allergies such as atopy (Ha et al., 2003), and among the chemical components of lavender essential oil, linalol is known to have antibacterial, antifungal, and anti-infective functions (Cavanagh & Wilkinson, 2002). However, research on improving the problematic scalp using lavender oil is insufficient.

Therefore, in this study, we want to verify whether lavender oil has a positive effect on improving sensitive scalp and contribute to providing consumers with safer and more effective scalp health solutions.

2. Literature Review

2.1. A Sensitive Scalp

Sensitive skin refers to a scalp that is sensitive due to a significantly lower amount of protective dead skin cells and reduced sebum secretion compared to a normal scalp, and the hair is thinner and less elastic (Kwon, 2007).

Diagnosis The scalp is red and erythematous, and capillaries are visible throughout, as if congested due to poor circulation. Inflammation can easily occur, and in severe cases, hair loss can occur (Moon, 2003).

Sensitive scalp can be observed in all types of scalp, including dry, oily, and dandruffy scalps, and is often accompanied by itching due to poor resistance to bacterial and viral penetration. Stress, fatigue, congenital factors, prolonged dry scalp, disruption of body rhythm or balance, perimenstrual and postpartum periods, etc. are the causes (Kim et al., 2011), and it is recommended to improve stress by using non-irritating hair cosmetics (Park, 2011) and avoiding frequent chemical procedures, which are the main causes of sensitivity. After shampooing, dry your hair with cool air rather than hot air to reduce heat sensation, avoid scratching your scalp if it itches, avoid alcohol and smoking, and get enough sleep (Lee, 2013).

To manage symptoms, it is recommended to keep the scalp clean, control sebum secretion to minimize scalp irritation, and shampoo and rinse thoroughly every other day.

2.2. Shampoo

The purpose of shampoo is to cleanse the hair while stimulating the scalp to promote hair growth (Yang, 2010).

Scalp and hair dirt are sebum, dandruff, secretions from the body, and external substances such as styling agents and dust (Yoo, 2008). If left untreated, itching and odor appear due to dirt buildup, increased dandruff, and bacterial growth and stimulation (Lim, 2006). In more severe cases, the pores become clogged and the functioning of the hair papilla is impaired, preventing the normal development of the hair. Therefore, shampoos are used to clean the scalp and hair and to control the condition of the scalp (Kim et al., 2006; Kim, 2018).

2.3. Lavender Oil

Lavender oil, which has been used since Roman times as an ingredient in perfumes and flavors, can be applied directly to the skin and has a calming effect on the heart. It is effective for fatigue recovery, soothing, colic, sterilizing, insecticidal, antiviral, antidepressant, stimulates cell growth, and balances sebum secretion, so it

is effective for almost all skin types. It is also beneficial for oily scalp and hair loss (Ryu, 2008).

A few cautions: people with low blood pressure may experience numbness or drowsiness, and it is not recommended for use during the first trimester of pregnancy (Park, 2004).

3. Subjects and Methods of Research

3.1. Subjects and Duration of the Study

The study was conducted for four weeks from Oct. 28, 2024, to Nov. 25, 2024. The subjects of the study were those diagnosed with a sensitive scalp by expert opinion, those who understood and agreed to the experiment, and nine people who had no irritation or allergy to lavender oil and sensitive shampoo and were not exposed to excessive UV radiation.

3.2. A Method of Research

The study methodology consisted of measuring the degree of improvement in erythema, inflammation, and itching after using a sensitizing shampoo in combination with lavender essential oil. Scalp measurements were taken 3 hours after shampooing to minimize the margin of error, and a 3 cm area below the occipital bone on the erythematous and inflamed scalp was measured under the same conditions.

The photographic data from the scalp diagnostic device was viewed and analyzed by a dermatologist, who rated the subjects' improvement after the experiment on a five-point Likert scale: 5 for 'very much so', 4 for 'yes', 3 for 'moderate', 2 for 'not so much', and 1 for 'very much so', with higher scores indicating greater post-experiment improvement. A paired-sample t-test was conducted to determine the effect of improvement in scalp condition.

Table 1: Research Method

Research method
Selection of experimental subjects (n=9)
↓
Pre-experimental measurements
Measurement of scalp condition (erythema and inflammation)
↓
Experimental order
Using lukewarm water, scalp wet for a minute
↓
Squeeze 5-7 ml of shampoo into the palm of your hand
↓
Bubble for 5 minutes and organize with your hands
↓
Rinse thoroughly with lukewarm water

↓
Dry the scalp using a natural or dryer
↓
scalp diagnostic measurement

3.3. Materials and Tools

For sensitive scalp, we used Company A's green tea active shampoo and Company D's lavender essential oil. For blending, we used a homo blender by mixing 450 ml of shampoo with 50 ml of essential oil (Table 1). The homomixer used Company P's HMZ-30DN, and the scalp diagnostic device used B-tech's A-ONE TAB device (Table 2).

Table 2: Research Materials (Tools)

Research Materials and Tools			
			
Shampoo by A Co.	Essential oil by D Co.	HomoMixer by P Co.	Scalp Analyzer By B Co.

4. The Results of a Study

4.1. Changes in Scalp Erythema and Inflammation

At the result of using products containing lavender essential oil, erythema symptoms were alleviated after 4 weeks of the experiment in all cases 1 to 9 in the area of improving scalp erythema. In particular, in case 3, the scalp condition improved to near normal. As a result of the inflammation improvement analysis, it gradually improved from the second week of the experiment, and 3,5,7,9 cases, which were particularly severe inflammation, improved very much at the fourth week (Table 3). Therefore, the sensitive scalp shampoo containing lavender essential oil was found to be effective in improving the inflammation and erythema of the scalp.

4.2. Investigate the Improvement Effect after the

Experiment

Measurement of the degree of improvement effect is six items of scalp cleanliness, erythema, heat sensation, inflammation, itching, and condition improvement. The analysis results are as follows (Table 4).

In this study, we investigated the subjective improvement effect of 9 subjects after applying the scalp condition improvement program. The questionnaire, which consists of a total of 6 questions, calculated the average score based on the responses to each question on a Likert 5-point scale. The score was converted to 5 points for 'very much', 4 points for 'yes', 3 points for 'moderate', 2 points for 'not', and 1 point for 'very much', and the higher the score on the

5-point scale, the higher the improvement effect on the experiment.

After the experiment, a t-test was conducted to find out the effect of improving the scalp health of the subjects. As a result of the analysis, the average of each question is shown in <Table 4>.

The degree of sensitivity scalp improvement was 4.09 points for overall normality, followed by inflammation (M=4.56), scalp condition (M=4.33), scalp cleanliness and scalp erythema (M=4.22), itching (M=3.67), and heat improvement (M=3.56) in order ($p<0.05$, $p<0.01$).

Therefore, shampoo products containing lavender essential oil were found to be very effective in improving sensitive scalp.

Table 3: The scalp Erythema before and after

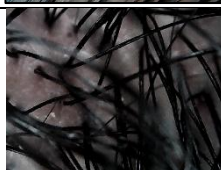
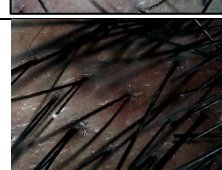
Case	Prior to the experiment	Week 1	Week 2	Week 3	Week 4
1 (27 years Male)					
2 (22 years female)					
3 (21 years Female)					
4 (25 years female)					
5 (27 years Male)					
6 (25 years Male)					
7 (23 years Female)					
8 (22 years Female)					
9 (24 years Female)					

Table 4: Investigate the improvement effect after the experiment

Category of Scalp condition	M	SD	t	p
Cleanliness	4.22	0.67	5.50	.00057**
Erythema	4.22	0.83	4.40	.00229**
Heat sensation	3.56	0.53	3.16	.0133*
Inflammation	4.56	0.53	8.85	.00002**
Itchy	3.67	0.87	2.31	.0497*
Improvement of scalp condition	4.33	0.50	8.00	.00004**
Total	4.09	0.73	10.94	1×10^{-13}

* $p < 0.05$, ** $p < 0.01$,

5. Conclusions and Suggestions

In this study, shampoo containing lavender essential oil was used to evaluate its effect on the improvement of the sensitive scalp. It was applied to a total of 9 subjects for 4 weeks, and the subjective evaluation of the subjects on the degree of scalp cleanliness, erythema, Heat sensation, inflammation, itchiness, and improvement of scalp condition were conducted using a scalp diagnostic device.

In conclusion, all items in the experiment showed a positive effect on scalp improvement, which is recommended to use lavender essential oil not only as a sensitive scalp management but also as a preventive measure of healthy scalp management.

References

- Cavanagh, H. M. A., & Wilkinson, J. M. (2002). Biological activities of lavender essential oil.
- Ha, H.-j., et al. (2003). *Jane Buckle's clinical aromatherapy* (Hyunmunsa), p. 40.
- Jeon, Y.-g. (2014). *The effect of management using AMTS and biological wave machines on scalp and hair condition* (Master's thesis, Sungshin Women's University), p. 106.
- Kim, E.-a. (2011). *Effects of scalp follicles on hair loss* (Master's thesis, Nambu University), p. 5.
- Kim, H.-r. (2018). *The actual condition of women's shampoo use and the scalp and hair improvement effect of shampoo containing white necked mushroom extract* (Master's thesis, Konkuk University), pp. 107–108.
- Kim, J.-h. (2005). *A study on customer satisfaction and development plans in scalp and hair management offices* (Master's thesis, Sookmyung Women's University), p. 17.

- Kim, K.-s. (2008). *A study on the management of sensitive scalp* (Master's thesis, Chung-Ang University), p. 1.
- Kim, K.-s., et al. (1995). *Hair care*. Cheonggu Cultural History.
- Kwon, D.-s. (2007). *A study on the parasitic status of hair cyst on the Korean adult scalp and the effect of death by various natural products (plant extracts)* (Doctoral dissertation, Hanyang University), p. 25.
- Lee, E. (2013). Seasonal health protector: Winter management alert issued, itchy and stinging sensitive scalp. *Korea Health Management Association*, 37(12), 34–35.
- Lim, Y.-h. (2006). *Consumer purchasing behavior and usage of hair cosmetics* (Master's thesis, Chung-Ang University), p. 5.
- Moon, Y.-r. (2003). *Awareness and attitudes of office workers on scalp and hair management* (Master's thesis, Sookmyung Women's University), p. 8.
- Oh, H.-g. (2002). *Aromatherapy handbook*. Yangmun Co., Ltd., p. 27.
- Park, M.-k. (2004). *Analysis of aroma usage behavior and related factors of skin care room users* (Doctoral dissertation, Daegu Oriental Medical University), p. 8.
- Park, Y.-a. (2011). *A study on scalp and hair characteristics and hair product usage* (Master's thesis, Honam University), p. 8.
- Ryu, K.-m. (2008). *A survey on awareness of aroma oil and scalp and hair management* (Master's thesis, Hannam University), p. 5.
- Ryu, S.-y. (2008). *A study on the scalp shape of correct shampoo habits and perception* (Master's thesis, Konkuk University), p. 5.
- Yang, T.-k. (2010). *Study of shampoo techniques using Meridges massage* (Master's thesis, Seokyeong University), p. 54.

Websites

- http://www.bomtech.net/korean/product_old_default.html?cate=product5
- http://www.yuyuinst.co.kr/shop/item.php?it_id=1495001050&ca_id=10a030&page=1
- <https://www.ssg.com/item/itemView.ssg?itemId=1000572596778>
- https://www.doterra.com/KR/ko_KR/p/lavender-oil