

## RESEARCH ARTICLE

# The Efficacy and Safety of the Botanical Shampoo Containing Morus Alba Root Extract in Mild to Moderate Alopecia of the Scalp: A Single Center, Open-Label, Pilot Study

Jinseop Kim and Won-Serk Kim\*

Department of Dermatology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

**\*Corresponding Author:** Won-Serk Kim, Department of Dermatology, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, 29 Saemunan-ro, Jongno-gu, 03181 Seoul, Republic of Korea, Tel.: +82-2-2001-2227, Fax: +82-2-2001-2236, E-mail: susini@naver.com

**Citation:** Jinseop Kim, Won-Serk Kim (2023) The Efficacy and Safety of the Botanical Shampoo Containing Morus Alba Root Extract in Mild to Moderate Alopecia of the Scalp: A Single Center, Open-Label, Pilot Study. J Dermatol Skin Care 3: 103

## Abstract

Morus alba, commonly known as white mulberry, has been widely used in traditional medicine for its various health benefits. In recent years, researchers have focused on exploring its potential as a natural remedy for promoting hair growth. Morus alba root extract (MARE) was known to activate  $\beta$ -catenin and enhance growth factor secretion related to the telogen-to-anagen transition.

We conducted a clinical study to evaluate the hair growth effect by applying a shampoo formulation containing MARE in 18 hair loss patients. As a result of the clinical study, the thickness and density of hair showed a significant increase after using the shampoo. Through the results of this study, hair products using MARE can be proposed as a safe and convenient method for hair loss treatment.

**Keywords:** Alopecia, Morus Alba Root Extract, Shampoo

## Introduction

Alopecia is one of the most common dermatologic conditions where the hair follicles shrink with growth hindrance due to various factors, including genetic predisposition, hormonal imbalance, and senescence. Although finasteride and minoxidil have been approved by US Food and Drug Administration as androgenetic alopecia (AGA) treatment and used widely, drug-induced side effects such as sexual adverse events or hypertrichosis make AGA patients hesitant to treat [1,2]. Therefore, there have been many clinical trials for new agents in hair loss. Past studies have yield some important insight into botanical extracts in alopecia treatment [3]. The purpose of this study was to evaluate the efficacy and safety of the botanical shampoo containing *Morus alba* root extract in Alopecia.

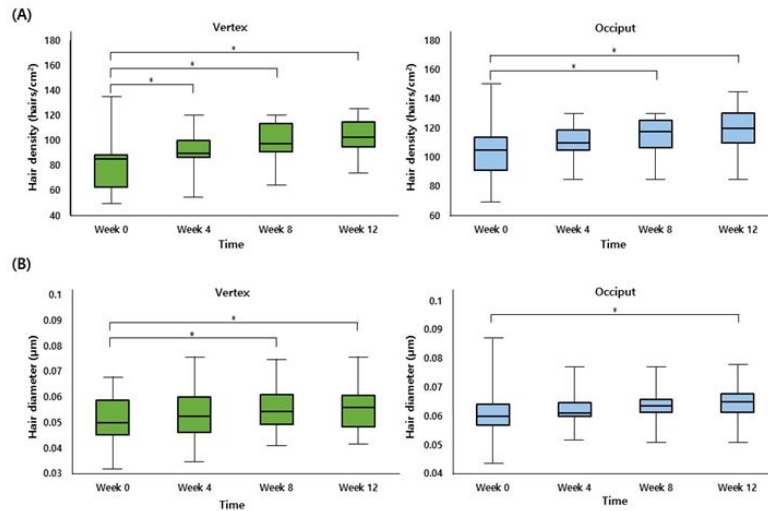
## Materials and Methods

This single-arm, prospective clinical trial was conducted to evaluate efficacy and safety of botanical shampoo in mild to moderate Alopecia. The Institutional Review Board of Kangbuk Samsung Hospital approved this study (KBSMC-2021-08-003). From August 2021 to August 2022, Korean subjects in the age range of 20 to 65 years with Norwood-Hamilton stage 2 to 4 male subjects or Ludwig stage 1 or 2 female subjects were enrolled. Any patients who had cosmetic procedure such as hair dyes within 2 months were excluded. Any patients who received oral finasteride or topical minoxidil within 2 months were also excluded. The C3 shampoo (Caron bio Co., Seoul, Korea) containing *Morus alba*, *Camellia sinesis*, and *Ficus carica* was tested. The shampoos were used once a day for 8 weeks, an appropriate amount (3–5g) was evenly applied to the scalp to massage and left in for 3 minutes or more. The scalp and hair were then rinsed with lukewarm water.

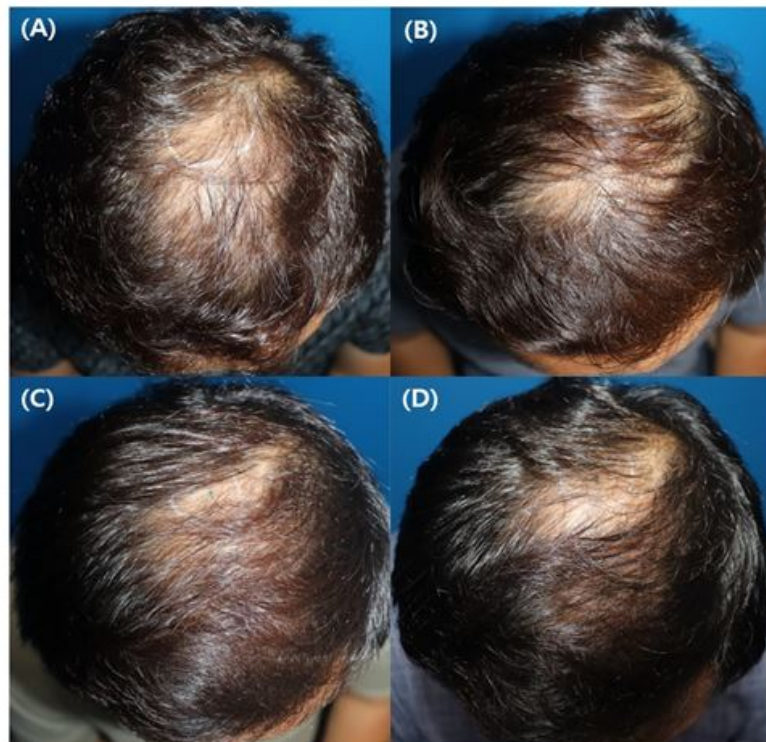
At 0, 4, 8, and 12 weeks, photo-documentation and folliscope analysis were performed. Changes of hair density and hair shaft thickness were assessed by folliscope (ASW200, Aram HUVIS Co., Seoul, Korea). Improvement was evaluated representatively in the hairless area of the vertex and the seemingly normal-appearing area of the occiput, and tattooed for reproducibility. The outcome measures were the improvements in hair density and hair shaft diameter in the two assessed areas at every follow-up visit compared with baseline. Two dermatologists used Quartile Improvement Scale (QIS) to assess clinical improvements at 12 weeks after treatment: worse (0); little or no change (1); mildly improved (2); moderately improved (3); and markedly improved (4). Participants were asked to assess subjective satisfaction score as follows: dissatisfied (0); somewhat dissatisfied [1-4]; neutral (5); moderately satisfied [6-9]; and very satisfied (10). Possible adverse events were recorded at each visit. Statistical analyses were performed using SPSS 24.0 software and paired Student t test was used. A P value of <0.05 was considered statistically significant.

## Results

Out of total enrolled (n = 20) subjects, two subjects were lost to follow-up during the COVID-19 outbreak in Korea, and 18 subjects with a mean age of  $53.5 \pm 5.91$  years completed all follow-up assessments. Eight subjects (8/18, 44.4%) were female and ten subjects (10/18, 55.6%) were male. After 12 weeks, the total average hair density in the vertex was  $103.33 \pm 19.87$  hairs/cm<sup>2</sup> compared with  $81.1 \pm 22.07$  hairs/cm<sup>2</sup> at baseline, demonstrating a statistically significant increase of approximately 22 hairs/cm<sup>2</sup>. Hair density in the vertex was significantly increased at each visit compared with baseline. Hair density in the occiput was also significantly increased over baseline after 8 weeks (Figure 1A). Figure 2 shows a photographic images of each visit of a patient who exhibited marked improvements. After 12 weeks, the average hair diameter increased from  $50.83 \pm 8.97$   $\mu$ m to  $55.56 \pm 9.31$   $\mu$ m in the vertex and from  $60.06 \pm 9.84$   $\mu$ m to  $64.56 \pm 6.79$   $\mu$ m in the occiput (Figure 1B). Study investigators reported an average QIS of  $3.1 \pm 0.4$ , corresponding to moderate improvement in overall Alopecia. The subjective satisfaction with the treatment outcome was  $7.2 \pm 1.4$ . This score corresponds to moderate satisfaction, which was similar to the study investigators' QIS scores. During the study period, no significant adverse events were reported.



**Figure 1:** Average change in (A) hair density, (b) hair diameter (\*P < .05). The values statistically significantly differed among the time points in each area.



**Figure 2:** Representative images of clinical improvement with treatment follow-up in a 47-year-old male subject. (A) Week 0, (B) Week 4, (C) Week 8 (D) Week 12

## Discussion

The use of herbal extracts for the treatment of hair loss has gained significant attention in recent years. Several herbal extracts have been studied for their potential in mitigating hair loss. Saw palmetto (*Serenoa repens*) extract, for example, has been widely investigated for its anti-androgenic properties and its ability to inhibit 5- $\alpha$ -reductase, an enzyme involved in the conversion of testosterone to dihydrotestosterone (DHT) - a hormone known to contribute to hair loss [4]. Saw palmetto extract has shown promising results in improving hair growth and reducing hair loss in both animal models and clinical trials [5]. Another herbal extract commonly studied for hair loss is *Eclipta prostrata* (False Daisy).

This plant extract has been shown to possess hair growth-promoting effects by stimulating the proliferation of dermal papilla cells and increasing the expression of hair growth-related genes. Furthermore, *Ecliptaprostrata* extract has demonstrated antioxidant and anti-inflammatory properties, which may contribute to its hair growth effects [6]. In comparison to these herbal extracts, the effects of MARE on hair growth have also been investigated. MARE has been found to stimulate hair growth by promoting the proliferation and differentiation of hair matrix cells [7]. It has also been reported to increase the expression of growth factors such as vascular endothelial growth factor (VEGF) and insulin-like growth factor-1 (IGF-1), which are crucial for hair follicle development and maintenance [8].

In the present open label study, daily botanical shampoo containing *Morusalba*, *Camellia sinesis*, *Ficuscarica* is significantly effective in improving the hair density and hair diameter. The mechanism of action of this botanical formulation appears to be multidimensional. In a recent *in vitro* study, MARE extract increased  $\beta$ -catenin expression with translocation of  $\beta$ -catenin to the nucleus in dermal papilla cells, which upregulated various growth factor secretion [9]. In addition, MARE also induced dermal fibroblasts to secrete paracrine factors related to angiogenesis [10]. Polyphenol and flavonoid from *Camellia sinesis*, especially epigallocatechin gallate, have been reported to have anti-inflammatory effect and stimulate hair growth via its proliferative and anti-apoptotic effects on dermal papilla cells [3].

Although the studies on herbal extracts for hair loss are promising, it is important to note that the efficacy of these extracts may vary depending on the underlying cause of hair loss. Additionally, the formulations and concentrations of the extracts, as well as the duration of treatment, may impact their effectiveness. Furthermore, it is essential to conduct well-designed clinical trials with larger sample sizes and longer follow-up periods to assess the long-term efficacy and safety of herbal extracts for hair loss. In this study, the clinical and follicoscopic improvement were observed, but small sample size, absence of controlled group were the limitations in our study and further multicenter studies are needed.

## Conclusion

In this study, we found that daily botanical shampoo containing MARE showed some measurable efficacy in patients with Alopecia. Further research is needed to elucidate the optimal formulations, concentrations, and treatment protocols for botanical shampoo containing MARE. The findings from these studies can contribute to the development of effective and natural interventions for individuals experiencing alopecia.

## References

1. Mella JM, Perret MC, Manzotti M, Catalano HN, Guyatt G (2010) Efficacy and safety of finasteride therapy for androgenetic alopecia: a systematic review. *Arch Dermatol* 146: 1141-50.
2. Peluso AM, Misciali C, Vincenzi C, Tosti A (1997) Diffuse hypertrichosis during treatment with 5% topical minoxidil. *Br J Dermatol* 136: 118-20.
3. Dhariwala MY, Ravikumar P (2019) An overview of herbal alternatives in androgenetic alopecia. *J CosmetDermatol* 18: 966-75.
4. Prager N, Bickett K, French N, Marcovici G (2002) A randomized, double-blind, placebo-controlled trial to determine the effectiveness of botanically derived inhibitors of 5-alpha-reductase in the treatment of androgenetic alopecia. *Journal of Alternative and Complementary Medicine* 8: 143-52.
5. Pérez-García B, Martínez-Mir I, Palau-Almerich J, Molina-Ruiz AM, Saceda-Corralo D et al. (2019) Efficacy of oral saw palmetto extract in androgenetic alopecia: A systematic review and meta-analysis. *Journal of the European Academy of Dermatology and Venereology* 33: 710-6.
6. Rajeshkumar NV, Joy KL, Kuttan R, Ramsewak RS (2012) Nitrile and ethanolic extracts of *Ecliptaprostrata* inhibit proliferation of Ehrlich's ascites carcinoma cells. *Environmental Toxicology and Pharmacology* 34: 70-6.
7. Kim JH, Shin HS, Lee JH, Ryu HJ, Lee T et al. (2016) Promotion of hair growth by *Morus alba* root extract in cultured human hair follicles. *BioMed Research International*: 1-7.
8. Park GH, Park KK, Cho HI, Lee SH, Ryu MH et al. (2014) Mulberry extract stimulates the proliferation of dermal papilla cells and promotes hair follicle regeneration. *Journal of Dermatological Science*: 76: 44-51.
9. Hyun J, Im J, Kim SW, Kim HY, Seo I (2021) *Morus alba* Root Extract Induces the Anagen Phase in the Human Hair Follicle Dermal Papilla Cells. *Pharmaceutics* 13: 1155.
10. Im J, Hyun J, Kim SW, Bhang SH (2022) Enhancing the Angiogenic and Proliferative Capacity of Dermal Fibroblasts with Mulberry (*Morus alba*. L) Root Extract. *Tissue Eng Regen Med* 19: 49-57.