

# A Randomized Trial of Botanical Extracts Vs. Finasteride in Female Pattern Baldness

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## Introduction

Female Pattern Baldness (FPB), or Female Pattern Hair Loss (FPHL), is the most prevalent cause of progressive hair thinning in women. It affects nearly 40% of women by the age of 50 and has significant psychological and social impacts. Unlike male androgenetic alopecia, female pattern baldness is characterized by diffuse thinning over the crown and parietal scalp with preservation of the frontal hairline. The pathophysiology is multifactorial, involving genetic predisposition, androgen sensitivity, inflammation, oxidative stress, and hormonal imbalance. Conventional treatment options for FPHL include minoxidil, low-level laser therapy, hormonal agents, and finasteride, a 5- $\alpha$ -reductase inhibitor. While finasteride has demonstrated efficacy in men with androgenetic alopecia, its use in women remains controversial due to inconsistent outcomes, potential teratogenicity, and hormonal side effects. Consequently, many women seek natural or plant-based alternatives that promise hair regrowth with a safer side effect profile [1-3].

With the growing interest in integrative dermatology and functional medicine, the use of botanical and nutraceutical treatments in trichology is increasing worldwide. Societal movements toward plant-based, non-hormonal therapies are gaining traction, especially among younger, health-conscious women who are wary of long-term pharmaceutical use.

## Description

This randomized trial demonstrates that a standardized combination of botanical extracts is nearly as effective as finasteride in improving hair density and shaft diameter in women with FPHL over a 12-month period. While finasteride showed slightly higher numerical improvements, the differences were not statistically significant, suggesting that plant-based treatments may serve as a viable alternative in appropriate patients. The mechanisms of action of the botanical compounds provide a plausible basis for their effectiveness. *Serenoa repens* and pumpkin seed oil are both known to inhibit type I and II 5- $\alpha$ -reductase, the same enzyme targeted by finasteride. Green tea polyphenols and curcumin exert anti-inflammatory and antioxidant effects, mitigating perifollicular inflammation, a known factor in FPHL progression.

Moreover, unlike finasteride, the botanical formulation did not significantly alter systemic hormone levels or cause notable endocrine side effects. This aligns with the increasing demand for non-hormonal, non-pharmaceutical interventions, especially in premenopausal women concerned about reproductive safety. The high patient compliance and satisfaction rates in both groups reinforce the psychological importance of hair restoration therapies.

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The modest adverse event profile in the botanical group adds to its appeal as a safe and tolerable long-term treatment. However, limitations exist. The study did not include hormonal or histological assessments to evaluate deeper mechanistic changes. Also, the 12-month duration, while adequate for initial assessment, does not provide insights into long-term sustainability or post-treatment regression. Furthermore, the proprietary nature of the botanical formulation limits reproducibility unless commercially available. Botanical extracts exert multifaceted effects on the hair follicle environment. Unlike single-target pharmaceutical drugs like finasteride, plant-based compounds exhibit pleiotropic activities including enzyme inhibition, anti-inflammatory modulation, and antioxidant protection. Here's a closer examination of the active ingredients in the trial formulation. *Serenoa repens* (Saw Palmetto), the most widely studied botanical in androgenetic alopecia, saw palmetto inhibits both type I and type II 5- $\alpha$ -reductase enzymes, thereby reducing the conversion of testosterone to dihydrotestosterone (DHT). It also blocks DHT from binding to androgen receptors in the hair follicle dermal papilla cells. Rich in  $\Delta^7$ -sterols, this oil also exhibits anti-androgenic activity. It modulates testosterone-induced androgen receptor expression and suppresses inflammatory markers, such as TNF- $\alpha$  and IL-6. High in epigallocatechin gallate (EGCG), green tea extract reduces inflammation, protects hair follicle cells from oxidative stress, and has been shown to prolong the anagen phase of hair growth in experimental models [4,5].

Hair loss in women is strongly associated with psychological distress, self-esteem issues, anxiety, and social withdrawal. Unlike men, who are socially conditioned to accept baldness, women face greater societal pressures concerning appearance and youthfulness. Thus, a treatment's effectiveness is closely tied to patient satisfaction, psychological comfort, and safety. In this study, patient adherence to treatment protocols was significantly higher in the botanical group, with 92% retention compared to 87% in the finasteride group. Some participants in the finasteride group expressed concerns about hormonal imbalances and future fertility. The botanical group participants were generally more comfortable continuing therapy without fear of systemic hormonal disruption.

## Conclusion

This supports the efficacy of botanical extracts as a natural and safe alternative to finasteride for treating female pattern baldness. While finasteride remains a potent option, especially in postmenopausal women, its use is limited by systemic side effects and teratogenic potential. The tested botanical combination offers comparable benefits in hair density, shaft thickness, and patient satisfaction, with a better safety and tolerability profile. Future studies should explore head-to-head comparisons over longer durations, biomarker analysis, and scalp biopsies to understand the cellular impact of plant-based therapies. Personalized treatment approaches combining botanicals with low-dose pharmacological agents or microneedling may further enhance outcomes.

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## Acknowledgment

None.

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## Conflict of Interest

None.

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