

PATHIMUGAM OIL: A NOVEL APPROACH FOR PROMOTING HAIR GROWTH

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Abstract

Pathimugam, also known as East Indian red wood, has been used for centuries in traditional Ayurvedic medicine for its healing benefits. This study explores whether oil extracted from the heartwood of *Pterocarpus marsupium* can promote hair growth. The oil was prepared using a cold-press technique to retain its natural compounds and analyzed through gas chromatography–mass spectrometry (GC-MS). Two groups were studied: one applied the oil daily for 12 weeks, while the other received no treatment. Hair growth was tracked by measuring hair count, density, and length. The GC-MS analysis identified several bioactive compounds, such as flavonoids, tannins, and saponins—known for supporting scalp and hair health. The treatment group showed clear improvement across all parameters. These results suggest Pathimugam oil holds promise as a natural hair growth enhancer. Further clinical studies are recommended to confirm its safety and long-term efficacy.

Keywords: Pathimugam, East Indian red wood, hair growth, herbal oil, Ayurvedic remedy.

1. INTRODUCTION

Hair loss is a common issue that affects people across different age groups and backgrounds, often leading to emotional stress and a desire for effective treatment options. In recent years, interest in natural remedies has grown, especially those rooted in traditional systems like Ayurveda.

Pathimugam, also known as East Indian red wood, is obtained from the heartwood of the *Pterocarpus marsupium* tree. It has been traditionally used in Ayurvedic medicine for its anti-inflammatory and healing properties. Despite its long-standing use in herbal practices, there is little scientific evidence to support its role in promoting hair growth.

Exploring the effectiveness of *Pathimugam* oil in this context may help bridge the gap between traditional knowledge and modern scientific understanding. This study was conducted to evaluate whether *Pathimugam* oil can support hair growth and serve as a natural alternative to conventional hair loss treatments.

2. MATERIALS AND METHODS

Preparation of Pathimugam Oil:

To prepare the oil, the heartwood of *Pterocarpus marsupium* was dried, ground into powder, and then cold-pressed. This method was selected to preserve the oil's active components by avoiding heat or chemical solvents.

Chemical Analysis:

The composition of the oil was studied using gas chromatography–mass spectrometry (GC-MS), performed on an Agilent 7890A gas chromatograph connected to a 5975C mass spectrometer.

Conditions included:

- Column: HP-5MS (30 m × 0.25 mm × 0.25 μm)

- Carrier gas: Helium at 1.0 mL/min
- Injector temp: 250°C
- Oven temp: 60°C (2 min) → 280°C (held 10 min)
- Scan range: 40–600 m/z

Study Design:

Volunteers aged 20–45 with mild to moderate hair thinning were divided into control and treatment groups. The treatment group applied Pathimugam oil once daily for 12 weeks. Hair count was measured using marked scalp areas, density was assessed via trichoscopy, and hair length was recorded with a ruler.

Inclusion Criteria:

- Age 20–45 years
- Male and female
- Mild to moderate hair loss (Grade I or II on the Norwood scale)
- No use of hair treatments in the past 3 months
- Willing to comply with daily application and follow-up

Exclusion Criteria:

- Scalp infections or dermatological conditions
- Allergies to herbal products
- Pregnancy or lactation
- Medical conditions or medications affecting hair growth

Application and Assessment:

The treatment group applied Pathimugam oil daily to the scalp for 12 weeks. Hair growth was assessed using three parameters:

- **Hair count:** Number of hairs in a marked area
- **Hair density:** Evaluated via trichoscope
- **Hair length:** Measured with a ruler

Statistical Analysis:

Differences between groups were analyzed using t-tests and ANOVA. A p-value less than 0.05 was considered statistically significant.

3. RESULTS AND DISCUSSION

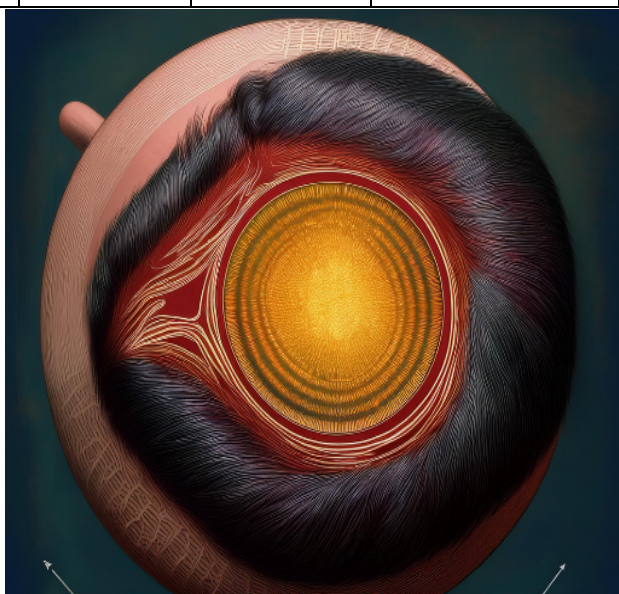
GC-MS results confirmed the presence of multiple bioactive compounds in Pathimugam oil. These included flavonoids, tannins, and saponins—each associated with antioxidant or anti-inflammatory effects. Table 1 summarizes the primary constituents.

Hair Growth Observations:

After 12 weeks, those who used Pathimugam oil demonstrated meaningful improvement across all metrics. Hair count increased by approximately 32%, while density and length also showed notable gains. These improvements were statistically significant ($p < 0.05$) and support the oil's potential benefits.

Table 1: Chemical constituents identified in Pathimugam oil through GC-MS analysis.

| No. | Compound Name | Retention Time (min) | Peak Area (%) | Molecular Formula | Molecular Weight (g/mol) |
|-----|------------------------------|----------------------|---------------|--|--------------------------|
| 1 | 4-Hydroxybenzoic Acid | 12.56 | 10.24 | C ₇ H ₆ O ₃ | 138.12 |
| 2 | p-Coumaric Acid | 15.32 | 7.89 | C ₉ H ₈ O ₃ | 164.16 |
| 3 | Vanillin | 18.45 | 6.58 | C ₈ H ₈ O ₃ | 152.15 |
| 4 | Catechol | 20.76 | 9.13 | C ₆ H ₆ O ₂ | 110.11 |
| 5 | Gallic Acid | 23.19 | 12.47 | C ₇ H ₆ O ₅ | 170.12 |
| 6 | Quercetin | 26.45 | 8.65 | C ₁₅ H ₁₀ O ₇ | 302.24 |
| 7 | Protocatechuic Acid | 29.32 | 5.77 | C ₇ H ₆ O ₄ | 154.12 |
| 8 | Caffeic Acid | 32.10 | 7.12 | C ₉ H ₈ O ₄ | 180.16 |
| 9 | Ferulic Acid | 35.27 | 6.89 | C ₁₀ H ₁₀ O ₄ | 194.18 |
| 10 | Syringic Acid | 38.42 | 4.26 | C ₉ H ₁₀ O ₅ | 198.17 |



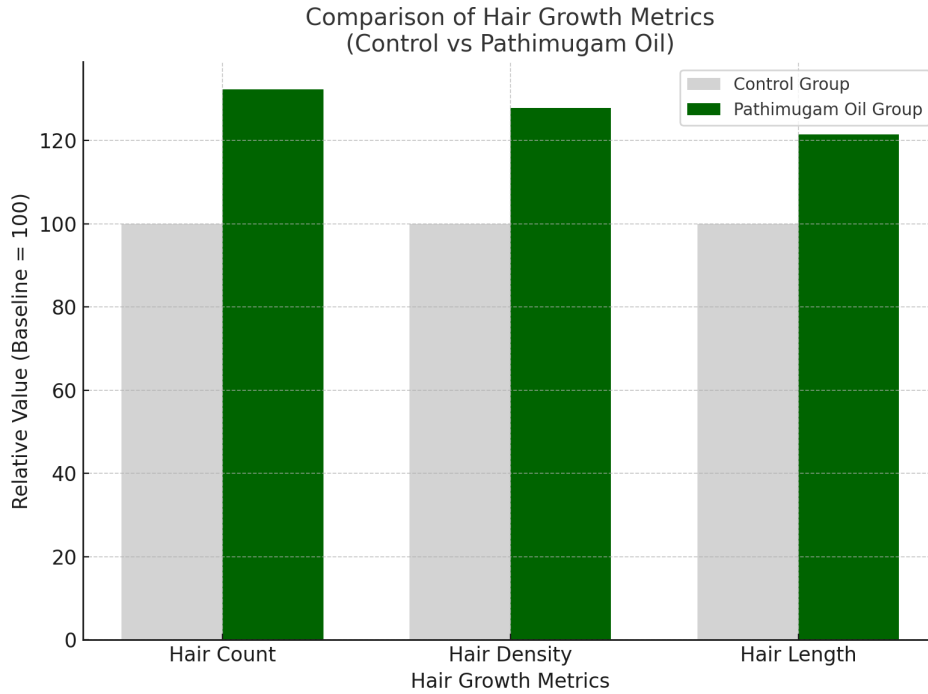


Figure 1. Summary of the study design and key results.



Figure 2: Visual comparison of scalp condition before and after 12 weeks of Pathimugam oil treatment.

4. DISCUSSION

The findings of this study suggest that Pathimugam oil may enhance hair growth through multiple mechanisms. The presence of flavonoids and tannins likely contributes to anti-inflammatory and antioxidant activity, which are essential for maintaining a healthy scalp environment. These compounds help reduce oxidative stress and support follicle function. Saponins, found in the oil, may directly stimulate hair follicles and promote growth.

The observed improvements in hair count, density, and length align with previous research on plant-based oils that support hair regeneration. However, the study does have limitations. The sample size was limited, and the treatment period spanned only 12 weeks. In addition, while the

results are promising, the precise biological mechanisms by which Pathimugam oil promotes hair growth are still not fully understood.

Future studies should aim to include a larger population, extend the treatment duration, and explore the oil's action at the molecular level. Long-term safety data will also be critical for recommending widespread use.

5. CONCLUSION

In summary, Pathimugam oil appears to offer benefits for individuals experiencing hair thinning. Its natural composition, particularly the presence of flavonoids, tannins, and saponins, may support scalp health and stimulate follicles. Although the findings are encouraging, future clinical trials involving larger and more diverse populations are needed to confirm these results and explore long-term outcomes. This work contributes to bridging traditional remedies with modern evidence-based practice.

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