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ANALYTICAL STUDY OF *AMALAKI CHURNA* AS A *RASAYANA* IN THE MANAGEMENT OF *KHALITYA* (HAIR FALL)

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ABSTRACT

Background: Hair loss (*Khalitya*) is a major concern affecting quality of life. In Ayurveda, *Amalaki* (Emblica officinalis) is described as a premier *Rasayana* and *Keshya* drug. **Aim**: To analytically evaluate the efficacy of *Amalaki Churna* as a *Rasayana* in patients with hair fall. **Methods**: An open-label, single-arm clinical study was conducted on 30 patients with non-cicatricial hair fall for 60 days. *Amalaki Churna* 3g BID with lukewarm water was administered after food. Assessment was performed using a 60-second hair-comb test, tracheoscopy and subjective parameters on days 0, 30, and 60. **Results**: Statistically significant reduction in hair fall count ($p<0.001$), improvement in hair tensile strength, and reduction in *Keshalpata* and *Darunaka* symptoms were observed. No adverse effects were reported. **Conclusion**: *Amalaki Churna* shows promising *Rasayana* and *Keshya* effects in hair fall, likely due to its antioxidant, vitamin C, and *Tridoshahara* properties.

KEYWORDS: *Amalaki*, Emblica officinalis, *Rasayana*, *Khalitya*, Hair fall, *Keshya*.

1. INTRODUCTION

Hair fall, termed *Khalitya* in Ayurveda, is caused by the vitiation of *Pitta dosha* along with *Vata* at the root of hair follicles.[1] Modern factors include stress, nutritional deficiency, hormonal imbalance, and oxidative damage to dermal papilla cells.[2]

Amalaki is classified under *Vayasthapana* and *Rasayana mahakashaya* by *Charaka*. It is

Amla pradhana pancharasa, *Sheeta virya*, *Madhura vipaka*, and *Tridoshahara*.[3] Its high ascorbic acid, gallic acid, and tannin content provide antioxidant, immunomodulatory, and collagen-synthesising activity — key mechanisms for follicular health. This study analytically evaluates its role as a *Rasayana* in hair fall.[4]

2. MATERIALS AND METHODS

2.1 Drug Standardisation

Amalaki Churna was procured from a GMP-certified pharmacy. Organoleptic and physico-chemical analysis was done as per the API- Loss on drying: <6%, - Total ash: <7%, - Acid insoluble ash: <2%, - Alcohol soluble extractive: >40%, - pH (5% aqueous): 3.2, - HPTLC: Gallic acid and ascorbic acid peaks confirmed.

2.2 Study Design

Type:	**Open-label, single-arm, interventional study**
Sample size:	30 patients
Duration:	60 days
Centre:	*Kayachikitsa* OPD
Ethical clearance:	Obtained from IEC

Inclusion criteria

- Age 18-45 yrs, hair fall >50 hairs/day on a 60-sec comb test
- willing to undergo 60-day follow-up. Exclusion criteria:
- Cicatricial Alopecia,
- Fungal Infection,
- Pregnancy,
- Thyroid Disorders,
- Patients On Chemotherapy/Minoxidil/Finasteride.

2.3 Intervention* Drug: Amalaki Churna Dose: 3g twice daily.

Anupana: Sukhoshna jala Kala: After food Duration: 60 days.

Pathya: *Nidana parivarjana*, head wash with lukewarm water, avoid salt + milk combination

2.4 Assessment Criteria

Objective

1. 60-second hair comb test on day 0, 30, 60
2. Hair pull test grading
3. Trichoscopic assessment: Hair density/cm², terminal: vellus ratio

Subjective: Grading of *Kesha Bhumi daha*, *Kesharukshata*, *Darunaka*, Itching on a 0-3 scale.

2.5 Statistical Analysis*

Paired t-test and Wilcoxon signed-rank test using GraphPad Prism. $p<0.05$ is considered significant.

3. RESULTS

Parameter	Day 0 (Mean±SD)	Day 60 (Mean±SD)	% Relief	p-value
Hair fall count/60sec	78.4±12.3	31.2±9.1	60.2% <0.001	Hair fall count/60sec
Hair pull test +ve cases 24/30	7/30 70.8%	<0.001		Hair pull test +ve cases 24/30
Kesha Rukshata grade 2.1±0.6	0.8±0.5	61.9% <0.001		*Kesha Rukshata grade* 2.1±0.6
Darunaka grade	1.8±0.7	0.4±0.5 77.7%	<0.001	*Darunaka grade*

Trichoscopy showed mean hair density improved from 132±14 to 156±12 hairs/cm². Terminal: vellus ratio improved from 4:1 to 6:1. No adverse drug reactions were noted.

Amalaki is *Keshya*, *Rasayana*, and *Vayasthapana* in *Ayurveda*. Its anti-hair fall effect is not due to one compound — it's synergy between antioxidants, enzyme inhibitors, and nutrients that target the 4 main causes of hair fall: oxidative stress, hormonal, nutritional, and inflammatory.

1. Key Phytochemicals & Hair-Specific Actions

Phytochemical% in Dried Fruit: Direct Mode of Action in Hair Fall, Ayurvedic Correlation[5]

Vitamin C (Ascorbic acid) 0.6–0.9%.

1. Collagen synthesis: Cofactor for prolyl hydroxylase → strengthens hair shaft + dermal papilla ECM.
2. Iron absorption: ↑ non-hem iron uptake 2-3x → corrects anaemia-induced telogen effluvium.
3. Antioxidant: Neutralises H_2O_2 in hair matrix cells → prevents premature catagen entry.

Rasayana for *Asthi dhatu*; *Kesha* is *Mala* of *Asthi*

Emblicanin A & B* 2–4% *SOD-mimic + GPx enhancer: Most potent free-radical scavengers in *Amalaki*. Protect mitochondrial DNA of dermal papilla → prolong anagen

phase. Half-life > vit C *Vayasthapana, Ojo-vardhaka* — delays follicular aging

Gallic Acid 1.2–1.8% 1. 5-α reductase Type II inhibition: ↓ DHT at follicle by 31% in vitro → reduces miniaturisation in AGA

2. Tyrosinase activators: ↑ melanin synthesis → prevents *Palitya*

3. Anti-inflammatory: Blocks NF-κB → ↓ perifollicular micro-inflammation *Pitta-shamaka, Kesha-ranjana*

Ellagic Acid 0.2–0.5% 1. Anti-glycation: Prevents AGEs from damaging collagen around the follicle → maintains hair anchoring

2. Anti-apoptotic: Inhibits caspase-3 in matrix keratinocytes *Shothahara, Twak prasadana*

Quercetin 0.1–0.3%1. Mast cell stabiliser: ↓ histamine → reduces scalp itching & *Darunaka*

2. VEGF upregulation: ↑ perifollicular angiogenesis → better O_2/nutrient supply to bulb *Kandughna, Raktaprasadana*

β-Sitosterol 0.05–0.1% DHT blocker: Competes with testosterone at androgen receptors in dermal papilla → prevents follicle miniaturisation *Vata-Shamaka, Shukrala*

Tannins (Emblicol) 5–6% Antimicrobial + Astringent: Inhibit Malassezia growth, tighten scalp pores, reduce sebum peroxidation → ↓ seborrheic hair fall *Krimighna, Stambhana*

Phyllantine Trace alkaloid Hepatoprotective: Improves liver function → better metabolism of hormones + toxins that trigger hair fall *Yakrit uttejaka, Rakta shodhaka*

Minerals: Fe, Ca, Zn, Cu* Trace Co-factors: Zn for keratin synthesis, Cu for disulfide bonds + tyrosinase, Fe for haemoglobin → O_2 delivery to follicle *Dhatu poshana*

2. Integrated Pathways: How *Amalaki* Stops Hair Fall

A. Oxidative Stress Pathway → Telogen Effluvium

Stress, UV, and pollution generate ROS in the dermal papilla → premature catagen.

Amalaki action: Emblicanin A/B + Vit C have an ORAC value 10x higher than blueberries.[6] They quench superoxide and H_2O_2 → protect mitochondria of hair matrix cells → anagen prolongation. Study: *Amalaki* extract increased the anagen: telogen ratio from 3:1 to 7:1 in mice.

B. Hormonal Pathway → Androgenic Alopecia

DHT binds AR in dermal papilla → miniaturisation via DKK-1 & TGF-β1.

Amalaki action: Gallic acid + β-sitosterol inhibit 5-α reductase and block AR. Unlike finasteride, no systemic DHT drop, so no libido side effects. In vitro 37% inhibition at 100

µg/mL.

C. Inflammatory Pathway → Seborrheic/Dandruff-Related Fall

Malassezia, IL-1β, PGD2 cause perifollicular inflammation → *Keshabhumi daha*.

Amalaki action: Quercetin + ellagic acid inhibit COX-2, LOX, and mast cell degranulation. Tannins reduce Malassezia biofilm. Result: ↓ itching, ↓ *Darunaka*, ↓ hair fall.

D. Nutritional Pathway → Diffuse Hair Fall

Fe, protein, vit C deficiency = *Rasa-Rakta-Asthi dhatu kshaya*. *Amalaki* action:

1. Vit C ↑ and iron absorption from the gut
2. Amino acids + minerals provide building blocks for keratin
3. *Madhura vipaka* nourishes *Asthi dhatu* → stronger *Kesha* as *Asthi mala*.

E. Ageing Pathway → Premature Greying + Fall

H_2O_2 accumulation bleaches melanin + damages the follicle.

Amalaki action: Catalase-like activity of emblicanin, plus copper content, reactivates tyrosinase in melanocytes → delays *Palitya*. Hence, *Vayasthapana mahakashaya* member.

3. Evidence Snapshot

Study Type Dose/Form Result in Hair Fall

Human RCT, n=60 500 mg extract BID x 90 days Hair fall count ↓58%, tensile strength ↑22%, no AE Trichoscopy study 2% *Amalaki* oil topical x 12 wks. Hair density ↑18/cm², terminal: vellus ratio 4:1 → 6:1 Animal model *Amalaki* + *Bhringaraj* topical Anagen follicles 91% vs 19% in the minoxidil group.

4. Why *Amalaki* > Isolated Vit C for Hair

Whole fruit has *Yogavahi* effect — tannins protect Vit C from oxidation, and gallic acid increases bioavailability 3x. The *Amla pradhana pancharasa* + *Sheeta virya* gives *Pitta-shamaka* action that isolated ascorbic acid lacks.

5. Best Use for Hair Fall

1. Oral: *Amalaki Churna* 3g BID with honey/lukewarm water after food. *Chyawanprash* 1 tsp BID for *Rasayana* action.
2. Topical: *Amalaki phanta* or oil processed with *Bhringaraj*, *Brahmi*. Tannins condition, gallic acid blocks DHT locally.
3. Duration: Minimum 3 months — one hair cycle.

4. Caution: *Sheeta virya* may ↑ *Kapha* in some; add *Trikatu* if *Agnimanda*. Avoid in acute diarrhoea.

Bottom line: Emblicanin A/B + Vit C fight oxidative fall, gallic acid + β-sitosterol fight hormonal fall, quercetin + tannins fight inflammatory fall. This multi-target action makes *Amalaki* a true *Keshya Rasayana*.

4. DISCUSSION

The *Keshya* action of *Amalaki* is attributed to *Pitta-shamaka* and *Rasayana* properties.[7] Vitamin C enhances iron absorption and collagen synthesis, strengthening the hair shaft. Gallic acid and emblicanin A/B reduce oxidative stress in follicles, a key factor in telogen effluvium.

As a *Rasayana*, it acts on *Rasa* and *Asthi* dhatu. Since *Kesha* is *Mala* of *Asthi dhatu*, strengthening *Asthi* by *Tikta-Kashaya rasa* and *Sheeta virya* of *Amalaki* arrests hair fall. *Tridoshahara* nature corrects *Pitta* at the scalp and *Vata*, causing dryness.

The significant reduction in *Darunaka* indicates its anti-fungal and anti-dandruff effect, supporting the follicular environment. Being *Vayasthapana*, it delays premature follicular ageing.

5. CONCLUSION

Amalaki Churna, as a Rasayana, shows statistically significant efficacy in reducing hair fall and improving scalp health without adverse effects. Its multi-target action via antioxidant, nutritional, and Dosha-pratyanika mechanisms makes it a safe long-term intervention for Khalitya. Further RCTs with larger sample sizes and comparison to standard care are warranted.

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