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Review Article

MODE OF ACTION OF *KHALITYAHARA YOGA (ANUBHUTA)* IN THE MANAGEMENT OF *KHALITYA* (HAIR FALL): A CONCEPTUAL REVIEW

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ABSTRACT

Khalitya (hair fall) is a widely prevalent global condition heavily influenced by genetics, hormonal imbalances, psychological stress, and environmental factors. Modern countermeasures often fall short, prompting a need for promising alternative therapies. This conceptual review evaluates the therapeutic mechanism of *Khalityahara Yoga*, an empirically validated *(Anubhuta)* poly herbo-mineral Ayurvedic formulation. Comprising an 8:1:1:8 proportional blend of *Avipattikar Churna, Laghu Sutshekhara Rasa, Kamdudha Rasa*, and *Shatavari Churna*, it is administered twice daily at 4.5gm with milk. Ayurveda attributes *Khalitya* to vitiated *Pitta* and *Vata* burning the scalp *(Keshabhoomi),* followed by *Kapha* and *Rakta* blocking hair roots to prevent regrowth. *Khalityahara Yoga* targets this systemic pathology across three distinct phases. First, it restores metabolic fire *(Agni)* and eliminates toxin blockages *(Ama)* to re-establish a comprehensive nutrient pipeline. Second, its biological components exhibit anti-androgenic, anti-inflammatory, and antioxidant actions-neutralizing free radicals, suppressing destructive cytokines (TNF-α, IL-1β) via the NF-κB pathway, and inhibiting the follicle-shrinking 5-alpha-reductase enzyme. Finally, it upregulates vital growth factors (VEGF, IGF-1) to rebuild microvasculature and safely prompt robust keratin synthesis. By bridging traditional humoral balancing with cellular pharmacology, *Khalityahara Yoga* offers a holistic, multi-targeted remedy to arrest active shedding and regenerate miniaturized hair follicles.

INTRODUCTION

Hair plays a significant role in enhancing beauty and self-image. In the modern world, where beauty and fashion are gaining more attention globally, the concept of beauty is evolving, and both men and women are equally concerned about their hair and overall appearance. Thus, understanding the importance of hair in beauty and taking appropriate measures to care for it has become increasingly significant in today's society.

Hair fall is most commonly prevalent in people who have a family history of hair fall, genetic factor plays major role in this. 40% of the population of India suffering this loss includes women and the primary cause is hormonal imbalance.[1] Other factor such as traumatic, surgeries and major illnesses, use of medication, depression, autoimmune disease, nutritional deficiencies, shock, faulty hair care, pollution etc. can also triggers hair fall. Presently employed counter measures are turning short for curing it.

In Ayurvedic approach, falling of hair is coined out as in term of *Khalitya* under the broad heading of *Shiroroga*[2] and *Kshudraroga*.[3]

According to Acharya Charaka vitiated Tejas *(Pitta)* along with *Vata* and *Kapha* burns the *Keshabhoomi* (scalp skin) and due to this a person's hair starts shedding rapidly causing *Khalitya* (Hair fall). Acharya Sushruta and Vagbhatta further explained that after shedding by *Pitta* and *Vata* the roots of hair get blocked by vitiated *Kapha* and *Rakta dosha* resulting in no new hair growth. Which will result in baldness (alopecia). Also, *Kesha* is considered as *Updhatu* of *Asthi dhatu* which is getting nutrition

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from *Meda dhatu*. So, any deficiency in *Asthi dhatu* can lead to loss of *Kesha* also.

Local therapies like *Abhyanga* (massage), *Nasya, Lepa* (hair pack), *Shiro-pichu, Shiro-dhara* have been indicated by various acharya to deal with *Khalitya*. But better results can only be obtained by combining local therapies with internal medicines to balance vitiated *Dosha*.

Khalityahara Yoga is a polyherbo-mineral *Anubhuta* (empirically validated from clinical practice) formulation comprising four constituent formulations - *Avipattikar Churna, Sutshekhara Rasa, Kamdudha Rasa*, and *Shatavari Churna.* It is designed to target the root cause vitiated *Pitta* dominant *Tridosha, Asthi dhatu kshay*, hormonal imbalance, digestive irregularities etc. of *Khalitya Samprapti* in body.

MATERIALS AND METHODS

- **Conceptual Framework:** Classical texts like Sushruta Samhita, Charak Samhita, Ashtang Hridya, Bhaishajya Ratnavali, Sharangdhara Samhita, Yogratnakara along with central database like AFI have been thoroughly read to accomplish a positive connection of "how *Khalitya*hara yoga will work in the management of *Khalitya*".
- **Modern Search:** Along with ancient references modern databases like PubMed, Google Scholar, AYUSH research portal and previous research work done by Ayurveda scholars using keywords related to the ingredients were also been scanned to search about ingredient and its efficacy on hair fall.

Formulation Composition and Pharmacological Profile

The formulation is a mixture of *Avipattikar churna, Laghu Sutshekhhar Rasa, Kamdudha Rasa* (*Samanya*) and *Shatavari Churna*. All ingredients blended in a definitive 8:1:1:8 proportional ratio. [Table 1] It is administered in a total single dose of 4.5g (4500mg), taken twice daily with milk (*Ksheera*) as the therapeutic vehicle (*Anupana*).

Here, *Avipatiikara churna* is made as per the Ayurvedic Formulatory of India, part-I, 7:2. It contains *Trikatu (Sunthi, Maricha, Pippali), Tiphala (Amalaka*, *Bibhitaki, Haritaki), Musta, Ela, Patra* in equal qunantity. It contains highest amount of *Trivrutta*, *Lavanga*, and *Sarkara* making it most favourable medicine to be working on *Agnimandhya, Amlapitta*, *Malabandha* etc. [Table 2]

Kamdudha rasa is prepared as per *Rasayogsagar* reference. In which it is made by repeatedly triturating and processing *Svarna Gairika* with *Amalaki Svarasa* for 21 *Bhavana* cycles to achieve *Mardava* (fineness) and reduce particle size to nano-range. The preparation is then mixed with *Go-ghrita* for administration. *Swarna gairika, Go-ghrita* and *Amalaki swarasa* making it helpful to pacify aggravated *Pitta*. Also, it will increase *Rakta dhatu*. [Table 2]

Laghu sutshekhara rasa is prepared as per Ayurvedic Pharmacopoeia of India Part II Vol. III by triturating *Swarna gairika, Sunthi churna* and *Nagarvalli svarasa* in the classical *Bhavana* (levigation) method. It is indicated in *Pittaja shirashoola, Ardhavabhedaka,* and other conditions occurring due to vitiated *Pitta*. [Table 2]

Shatavari churna is classical single drug preparation from Asparagus racemosus Wild. It is one of a *Rasayana* drug in the Ayurvedic pharmacopoeia, classified under *Jivaniya, Balya* and *Brimhana* groups. It possesses *Madhura– Tikta rasa, Guru– Snigdha–Mridhu guna* with *Shita virya, Madhura vipaka*. It can promote *Ojas*, can pacify aggravated *Pitta* and give nourishment to *Rasaadi dhatu*. [Table 2]

Table 1: Quantitative Composition of *Khalitya*hara Yoga (Per Dose)

No.	Sanskrit Name	Latin Name	Part used	Dose	Part
1	***Avipattikara churna***		***Churna***	**2gm**	**8 parts**
a.	*Sunthi*	*Zingiber officinale* Rz.	Rhizome		
b.	*Marica*	*Piper nigrum* Fr.	Fruit		
c.	*Pippali*	*Piper longum* Fr.	Fruit		
d.	*Haritaki*	*Terminalia chebula* P.	Fruit pulp		
e.	*Bibhitaka*	*Terminatlia bellirica* P.	Fruit pulp		
f.	*Amalaki*	*Phyllanthus emblica* P. *(Emblica officinalis)*	Fruit pulp		
g.	*Musta*	*Cyperus rotundus* Rz.	Rhizome		
h.	*Vida lavana*	-	Mineral		
i.	*Vidanga*	*Embelia ribes* Fr.	Fruit		
j.	*Ela*	*Eletteria cardamomum* Sd.	Seed		
k.	*Patra*	*Cinnamomum tamala* Lf.	Leaf		
l.	*Lavanga*	*Syzygium aromaticum* Fl. Bd.	Flower bud		

m.	*Trivruta*	*Ipmoea turpethum* Rt.	Root		
n.	*Sarkara*	Cane sugar			
2	***Laghu Sutshekhara rasa (A.P.I. part II, Volume III)***		***Churna***	**250 mg**	**1 part**
a.	*Svarna Gairika*	Red ochre of iron	Powder		
b.	*Sunthi*	*Zingiber officinale* Rz.	Rhizome		
c.	*Nagavalli swarasa*		Leaf		
3	***Kamdudha rasa (*Rasayogsagar, pg-260)**		***Churna***	**250 mg**	**1 part**
a.	*Svarna Gairika*	Red ochre of iron	Powder		
b.	*Go ghrita*	*Cow ghee*	-		
c.	*Amalaki*	*Phyllanthus emblica* P. *(Emblica officinalis)*	Fruit pulp juice *(Swarasa)*		
4	***Shatavari churna***	***Asparagus racemosus***	**Root**	**2 gms**	**8 parts**

Table 2: *Rasa Panchaka* Profile of Ingredients

S. No.	Ingredient	Category	*Rasa*	*Guna*	*Virya / Vipaka*	*Dosha Karma*
1.	***Avipattikara churna* (AFI, part-I, 7:2)**					
a.	*Sunthi*	Herbal	*Katu*	*Laghu, Ruksha, Tikshna*	*Ushna / Madhura*	*Dipana, Pacana, Amapacana, Vatashamana*; corrects *Vishama Agni* reduces *Ama* from *Rasa dhatu.*
b.	*Marica*	Herbal	*Katu*	*Laghu, Ruksha, Tikshna*	*Ushna / Katu*	*Dipana, Krimighna, Shoshana, Amapacana;* anti-microbial; enhances bioavailability of other drugs.
c.	*Pippali*	Herbal	*Katu*	*Laghu, Snigdha, Tikshna*	*Anushna / Madhura*	*Dipana, Brimhana, Rasayana, Vatashamana;* promotes *Dhatu poshana*; piperine enhances drug absorption
d.	*Haritaki*	Herbal	*Pancha rasa (Lavana* absent*)*	*Laghu, Ruksha*	*Ushna / Madhura*	*Tridoshaghna, Rasayana, Anulomana, Medhya;* tannins promote *Ojas*; regulates *Vata*-dominant *Samprapti* of *Khalitya*
e.	*Bibhitaka*	Herbal	*Kashaya*	*Laghu, Ruksha*	*Ushna / Madhura*	*Keshya, Chakshushya, Tridoshaghna, Dipana*; directly nourishes hair follicles (*Kesha mule*); gallic acid promotes scalp circulation.
f.	*Amalaki*	Herbal	*Pancha rasa (Lavana absent)*	*Laghu, Ruksha, Shita*	*Shita / Madhura*	*Rasayana, Keshya, Pittashamana, Brimhana;* primary *Keshya* drug; Vit. C promotes collagen in hair follicles; reverses oxidative stress-mediated hair loss.
g.	*Musta*	Herbal	*Tikta, Katu, Kashaya*	*Laghu, Ruksha*	*Shita / Katu*	*Dipana, Grahi, Kandughna, Dahashamana*; directly relieves scalp itching *(Kandu)* and burning *(Daha);* sesquiterpene compounds anti-inflammatory.
h.	*Vidanga*	Herbal	*Katu, Kashaya*	*Laghu, Ruksha*	*Ushna / Katu*	*Krimighna, Dipana, Virecana, Anulomana;* eliminates scalp parasites contributing to *Darunaka*; embelin shows significant antifungal activity.
i.	*Ela*	Herbal	*Madhura, Katu*	*Laghu, Ruksha*	*Shita / Madhura*	*Dipana, Hridya, Trishnaghna, Pittashamana*; balances *Pitta dosha*; improves palatability of the compound preparation.

j.	*Patra*	Herbal	*Tikta*	*Laghu, Ruksha*	*Shita / Katu*	*Dipana, Pittashamana, Kushthaghna, Krimighna*; addresses scalp skin disorders *(Darunaka, Kandu);* anti-inflammatory for scalp tissue.
k.	*Lavanga*	Herbal	*Katu, Tikta*	*Laghu, Tikshna, Snigdha*	*Shita / Katu*	*Dipana, Krimighna, Shulahara, Aruciharatva;* eugenol shows potent anti-inflammatory and anti-microbial activity; synergises with other drugs.
l.	*Trivruta*	Herbal	*Madhura, Tikta, Katu*	*Guru, Ruksha*	*Ushna / Katu*	*Recana, Virecana, Shodhana, Shothahara;* expels vitiated *Kapha* and *Pitta* from systemic circulation; facilitates *Dosha Shodhana*
m.	*Sarkara*	Herbal	*Madhura*	*Guru, Snigdha, Shita*	*Shita / Madhura*	*Pittashamana, Dahashamana, Brimhana, Anulomana*; serves as vehicle *(Anupana);* reduces *Pitta*-derived scalp burning; enhances palatability.
2.	***Sutshekhara Rasa* (A.P.I. part II, Volume III)**					
a.	*Svarna Gairika*	Mineral	*Madhura, Kashaya*	*Laghu, Shita*	*Shita / Madhura*	*Pittashamana, Keshya, Raktashodhaka, Krimighna;* cools scalp *Pitta*; iron promotes haemoglobin and supports *Raktashraya Kesha poshana*
b.	*Sunthi*	Herbal	*Katu*	*Laghu, Ruksha*	*Ushna / Madhura*	*Dipana, Vatashamana, Amapacana*; corrects *Agni* to support *Dhatu poshana*; removes Ama blocking *Kesha mula* nourishment
c.	*Nagavalli swarasa*	Herbal	*Katu, Tikta*	*Laghu, Ruksha, Tikshna*	*Ushna / Katu*	*Dipana, Krimighna,* antibacterial *(Bhavana dravya);* acts as processing medium for *Svarna Gairika*; enhances penetration and absorption
3.	***Kamadudha Rasa (Rasayogsagar, pg-260)***					
a.	*Svarna Gairika*	Mineral	*Madhura, Kashaya*	*Laghu, Shita*	*Shita / Madhura*	*Pittashamana, Keshya, Raktashodhaka;* cools vitiated *Pitta* responsible for *Daha, Kandu*, and *Darunaka*; supports *Rakta dhatu* purification
b.	*Go ghrita*	Animal product	*Madhura*	*Snigdha, Guru, Mridu*	*Shita / Madhura*	*Brimhana, Rasayana, Ojas-vardhaka, Pittashamana*; serves as *Anupana* vehicle; promotes *Ojas* and *Dhatu poshana* essential for *Kesha* nourishment
c.	*Amalaki svarasa*	Fruit	*Amla Pradhan*	*Laghu, Ruksha, Shita*	*Shita / Madhura*	*Rasayana, Keshya, Pittashamana; Bhavana* medium for *Gairika Shodhana*; Vit. C facilitates iron absorption; acts as *Bhavana dravya* enhancing therapeutic potency.
4.	*Shatavari Churna*	Herbal	*Madhura, Tikta*	*Guru, Snigdha, Mridu*	*Shita / Madhura*	*Rasayana, Brimhana, Balya, Pittashamana*, *Medhya*, *Garbhasthapana*; promotes Ojias; nourishes *Asthi dhatu*- the parent tissue of *Kesha*; adaptogenic effect helps counter stress-induced *Khalitya.*

Samprapti Vighatana

In *Khalitya*, *Teja (Pitta dosha)* with help of *Vata* dosha burns the scalp and shed the hair. Further in this *Samprapti*, *Kapha* along with *Rakta* creates obstruction in the *Romakupa*, so as to prevent the growth of new

hair from that place.[4] As per Acharya Vagbhatta, *Khalitya* is gradual falling of hair while severe and sudden falling of hair with lack of new hair growth is considered as *Indralupta*.[5]

Mithya Ahara and *Vihara, Manoabhighata* like mental stress, fright, anger, shock etc. may collectively increase the *Pitta* and *Vata Dosha*. The *Ushna* and *Tikshna* properties of *Pitta* get augmented whereas the *Vata* suffers an aggravation in *Ruksha, Khara* and *Chala* properties.

Here the aggravated *Pitta (Bhrajaka Pitta)* supported by the vitiated *Dehoshma* burns the *Keshabhoomi* whereas an increased *Vata* gives rise to more frequent and comparatively prolonged *Shira Sankocha* by its *Ruksha* and *Khara Guna*.

Rasa and *Rakta* circulation in the body and imparts nutrition to the body. When they are vitiated by the above said *Dosha* and may play a part as *Dushya* in *Khalitya*. As *Kesha* has been considered as *Asthi Dhatu mala, Asthi dhatu* is also an important part of *Samprapti* has been counted. Malnutrition of *Asthi dhatu* may cause lower production of *Kesha* causing *Khalitya*.

Jatharagni, *Rasagni, Raktagni* and *Asthyagni* are involved in *Khalitya*. Due to the disturbance of function of these *Agnis (Agnimandya), Ama* is produced.[6] Which further blocks all nutrient channels *(Srotas)* and blocks the *Poshana* reaching to *Rasaadi dhatu* and *Keshamula*.

To address all these factors *Khalityahara yoga* is carefully designed. It should be administered at 4.5gm twice daily with *Go-dughdha* as *Anupana*. It can work on root cause of *Khalitya* by five integrated mechanisms

Agni dipana* and *Ama pachana

One of the contents of *Khalityahara yoga* is *Avipattikar churna* which have *Triphala (Haritaki + Amalaki + Bhibitaki*), *Trikatu* (*Shunthi + Maricha + Pippali*), *Vidanga*, and *Lavanga* which act synergistically to restore normal *Agni* function by working at *Dhatwagni* and *Jatharagni* level. Other drugs also have *Katu Rasa, Ushna Virya* property it will increase *Agni* and will help to digest the *Ama*. By clearing *Ama* all nutrition supply chain *(Srotasa)* will get clear and proper nourishment will reach to *Asthi* dhatu and *Keshmula*. Here, *Trivruta* is main content which is an *Agraya* (best in class) in *Sukhvirechaka dravya*[7] and will eliminate excessive *Pitta dosha* by *Adhomarga*. The property of *Deepan - Pachan Karma* of *Katu* and *Tikta Rasa* containing drugs will directly act on the vitiated *Rasa Dhatu*. Purified *Rasa dhatu* will give proper nourishment to *Rakta dhatu* and so proper nourishment will reach to *Asthi dhatu*– the parent dhatu of *Kesha*. Which can result in proper growth of new hair.

Pitta–shamana: *Amalkai, Musta, Ela, Vidarikanda, Swarna Gairika* (in *Laghu sutshekhara rasa* and *Kamdudha rasa*) along with milk *(Anupana)* works collectively on aggravated and vitiated *Pitta*. These drugs contain *Madhura–kashay rasa, Madhur vipaka, Shit virya* properties which helps in addressing aggravated pitta. It is considered to be the primary cause for abnormal falling of hair.

***Kesha poshana* via *Asthi dhatu* nourishment**

Shatavari Churna, with *Go-dugdha anupana* gives *Brihmana* and *Rasayana* effect to the body. It gives direct nourishment to *Asthi Dhatu* and *Keshamula*. Thus, helping in regrow of hair from the follicles.

***Pitta – Rakta shodhana* (via rasa preparations)**

Ladhu sutshekhara rasa and *Kamdudha rasa* both contain *Swarna gairika* as one the main ingredient. It is classified as *Raktavrudhdhi kar* and *Pitta shamana* by nature. It purifies the *Rakta dhatu*, thus, by purify *Rakta dhatu* will give direct nourishment to *Kesha* via *Twaka* and also indirect nourishment to *Asthi Dhatu* via *Rakta* to *Mamsa–Mamsa* to *Meda* and *Meda* to *Asthi Dhatu*.[8]

***Go-dughda anupana– Yogvahi* enhancement**

Milk as *Anupana* acts as a *Yogavahi* (vehicle enhancing drug delivery to *Dhatu* level). Milk also serves as a direct *Pitta-shamaka* and *Brimhana* vehicle, ensuring that the oral formulation reaches *Asthi dhatu* through the sequential dhatu nourishment chain.

Modern Pharmacological Mode of Action

As per modern medical research, pathophysiology of the hair fall is a highly complex, multi-factorial dysregulation of hair follicle stem cells, intracellular signalling networks and microenvironmental issues of hair follicle. Diffuse hair loss occurs due to hormonal imbalance especially like increased testosterone, post-partum etc.

Hair follicles in affected area shows elevated levels of 5-alpha-reductase enzyme. This enzyme converts the testosterone (circulating) into Dihydrotestosterone (DHT). DHT binds to Androgen Receptors in dermal papilla of a hair resulting in shortening of Anagen phase with every consecutive cycle of hair growth resulting decrease density of hair.[9] As these follicles remain structurally intact but pathologically dormant, unable to regenerate new hair.

It can also occur due to environmental factors like pollution, dust, UV radiation etc., nutritional deficiency–poor diet, post CA treatment, smoking, aging, sleep deprivation etc. causing oxidative stress to the hair follicle cells and damage DNA.[10] Other systemic illness like any type of severe infection even on scalp, typhoid or malaria, fungal infection of scalp, dandruff etc. can lead to tissue inflammation of the scalp skin and hair follicles.

Hair fall can also be the result of the chronic psychological stress. In present, advancing fashion orientated culture faulty hair care using hair styling tool, using harsh chemicals etc damaging the hair follicles and shaft and generating irritative response to scalp skin leading to localise tissue inflammation hampering the nutritional supply to hair follicles, became also one of the reasons of hair fall.

The combination of *Khalityahara yoga* can counter act the main pathological pathways of hair fall to prevent hair follicles to become dormant or undergo through apoptosis.

Follicular Regeneration & Growth Factors

Shatavari in *Khalityahara yoga* is a premier *Rasayana* (rejuvenative) herb, rich in steroidal saponins (specifically Shatavarins I–IV), natural polyphenols, and plant-derived bioflavonoids. The steroidal saponins (Shatavarins) possess natural phytoestrogenic properties. By binding to estrogen receptors, they help stabilize hormonal fluctuations- such as those seen in postpartum states, PCOS, or perimenopause- that frequently cause diffuse hair shedding.[11] It also facilitate upregulation of Vascular Endothelia Growth Factor (VEGF) by expanding the follicle's microvasculature and ensuring the hair root receives a continuous supply of vital elements like zinc and iron.[12] *Shatavari* operates as a potent phytoadaptogen. It systematically regulates the hypothalamic-pituitary-adrenal (HPA) axis, minimizing the systemic release of cortisol. As a result, it prevents stress from triggering premature catagen or suppressing insulin-like growth factor-1 (IGF-1) signaling inside the hair follicle.[13]

Anti-Androgenic Activity

Khalityahara yoga has a distinct multi-targeted anti-androgenic activity which prevents, blocks and counter the damaging effects of dihydrotestosterone (DHT) on hair follicles. It contains *Amalaki, Bhringraja*, *Shatavari* and *Lavang*, which are known to have mild to moderate 5-alpha-reductase inhibitory action. To help prevent hair fall.[14]

Anti-Inflammatory & Antioxidant Effect

The therapeutic efficacy of *Khalityahara Yoga* in halting the progression of *Khalitya* (hair loss) relies heavily on its ability to systematically neutralize oxidative stress and eliminate perifollicular micro-inflammation.

Oxidative stress occurs when harmful Reactive Oxygen Species (ROS) accumulate in the scalp, damaging the DNA of hair matrix cells and causing them to die prematurely. This formulation uses a combination of mineral shields and plant antioxidants to neutralize these molecules.[15]

The antioxidant shield is anchored by the unique preparation of *Kamdudha Rasa,* which is levigated twenty-one times with fresh *Amalaki Svarasa* (fresh *Amla* juice). This intensive processing infuses the mineral base with an exceptionally high concentration of hydrolyzable tannins (emblicanins A and B), gallic acid, and vitamin C. These potent antioxidants directly scavenge free radicals within the scalp tissue, halting the lipid peroxidation that routinely destroys cell membranes in the hair bulb.

Kamdudha Rasa and *Laghu Sutshekhara Rasa* (containing *Gairika*, a purified red ochre/iron oxide) function as systemic cell-protecting agents. They neutralize the internal metabolic heat that triggers free radical production in the bloodstream.

Shatavari Churna delivers a high concentration of polyphenols and bioflavonoids. These active compounds directly scavenge free radicals within the scalp tissue. By stabilizing these volatile molecules, Shatavari prevents lipid peroxidation- the destructive process that damages cell membranes in the hair bulb.

By reducing the total ROS burden, this combination protects the mitochondrial DNA within dermal papilla cells. This ensures that the energy production required for active hair growth remains uncompromised. It also downregulates pro-catagen proteins like TGF-beta1, and allow growth factors to safely maintain the hair follicle in its active growing (anagen) phase.

When the scalp is inflamed, immune cells gather around the hair follicles, releasing disruptive proteins called cytokines. These cytokines signal the follicle to shut down and cast off the hair shaft. This formulation addresses that inflammation at its core.[16]

The localized inflammatory response normally upregulates Transforming Growth Factor-beta (TGF-β1 / TGF-β2) and Fibroblast Growth Factor-5 (FGF-5), both of which violently push hair out of the growing phase.

At the cellular level, the active gingerols in *Shunthi* (the herbal component of *Laghu Sutshekhara Rasa*) and the steroidal saponins in *Shatavari Churna* act as powerful anti-inflammatory agents. They work by inhibiting the NF-κB signaling pathway- the master genetic switch that triggers the release of disruptive cytokines like TNF-alpha, IL-1beta, and IL-6. By suppressing these cytokines, the formulation prevents the localized inflammation that signals the hair follicle to prematurely shut down and cast off its shaft. This prevents premature hair root regression and corrects a distorted anagen-to-telogen ratio.[17,18]

The soothing properties of *Shatavari* and *Kamdudha Rasa* calm hyperactive perifollicular nerve endings. This action intercepts the stress-induced release of Substance P, effectively stabilizing local mast cells and protecting the follicle from sudden, inflammatory-driven regression (telogen effluvium).

Nutritional Enrichment

The systemic administration of *Khalityahara Yoga* reverses the degenerative path of *Khalitya* (hair loss) by establishing a comprehensive, targeted multi-nutrient pipeline that directly enriches the hair follicle matrix.

The specific preparation of *Kamdudha rasa* utilizing *Suvaran Gairika* processed with 21 *Bhavanas* (levigations) of *Amalaki Svarasa* (fresh *Amla* juice)– introduces a massive, highly bioavailable charge of elemental iron. The abundant vitamin C from the fresh *Amla* juice chemically reduces ferric iron to ferrous iron, which remains soluble even at neutral pH. It helps in maximizing iron assimilation into the bloodstream. This direct enrichment treats underlying micro-anemia, boosts hemoglobin synthesis. *Amalaki* enhances the production of RBCss thus helping in enhancing the oxygen-carrying capacity of the blood supplying the scalp.[19]

The inclusion of *Go Ghrita* (cow ghee) in the processing of *Kamdudha Rasa* acts as a lipophilic (fat-soluble) carrier. This healthy lipid base encapsulates the minerals and fat-soluble vitamins, allowing them to easily cross cellular membranes in the scalp and deliver nutrients straight into the dermal papilla cells.[20]

Shatavari contains a dense natural profile of critical trace minerals- including structural calcium, zinc, copper, and manganese- alongside complex carbohydrates. By systematically nourishing the bone-tissue pathway, it delivers these essential elements directly to the dermal papilla, where zinc and copper act as vital co-factors for cell division and protein synthesis at the hair root.

Laghu sutshekhara Rasa consists of *Shudhdha gairika* and *Shunthi. Gairika* provides a direct, highly absorbable source of elemental iron, which addresses underlying micro-anemia- a leading driver of diffuse hair shedding (telogen effluvium). Crucially, the addition of *Shunthi* acts as a localized circulatory stimulant *(Deepana-Pachana).* Its warming properties dilate capillaries and reduce tissue resistance in the scalp, ensuring that the newly introduced iron and Shatavari's trace minerals successfully reach the hair root.[21]

DISCUSSION

Within contemporary trichological and Ayurvedic practices, considerable emphasis has been placed on localized external therapies for *Khalitya* (alopecia), including procedures such as *Shiro-Abhyanga* (cranial oleation), *Shiro-Pichu* (topical medicated pads), and *Shiro-Dhara* (cranial liquid shedding). While these therapies are highly popular, their isolated application often lacks a comprehensive understanding of the underlying, systemic pathophysiology of hair loss. The microenvironmental and macroenvironmental changes responsible for follicular degradation are deeply intertwined through complex cellular and metabolic pathways. Consequently, relying exclusively on topical or external scalp applications represents an incomplete treatment strategy.

To achieve sustainable follicular regeneration, clinicians must address the foundational systemic drivers of *Khalitya*, most notably *Agni-Dushti* (impaired digestive and metabolic capacity) and the resulting *Dhatu-Kshaya* (deep tissue nutritional deficiency). Because hair is clinically classified as the *Upadhatu* (direct tissue byproduct) of *Asthi Dhatu* (bone tissue), its structural synthesis is entirely dependent on the sequential, unhindered refinement of blood plasma *(Rasa)* and red blood cells *(Rakta).* When *Agni* is compromised, the production of systemic nutrients is disrupted, starving the hair matrix cells and triggering follicle miniaturisation.

Therefore, integrating targeted internal therapeutics alongside external therapies is a clinical necessity; internal administration of *Khalityahara yoga* can correct the systemic metabolic errors and restores the vital nutrient pipeline required to sustain healthy hair growth.

Probable Mode of Action of *Khalityahara Yoga*

Phase 1: Preparing the Body and Flooding it with Nutrients

Avipattikara Churna cleanses the digestive tract and resets the digestive fire *(Agni).* This action expands intestinal absorption, allowing the body to fully utilize the vital minerals taken alongside it. *Laghu Sutshekhara Rasa* and the specialized *Kamdudha Rasa* then deliver a massive charge of pure elemental iron *(Suvarna Gairika)* and structural minerals. Because this iron is processed with twenty-one *Bhavanas* (levigations) of *Amalaki Svarasa* (fresh *Amla* juice), the abundant vitamin C chemically converts the iron into its most absorbable form. Enriched by the fat-soluble carrier *Go-Ghrita* (cow ghee) and the tissue-rejuvenating power of *Shatavari Churna*, this rich mix of iron, calcium, and zinc travels easily across cell membranes to nourish the bone-tissue pathway *(Asthi Dhatu)* and feed the hair root.

Phase 2: Clearing Inflammation and Blocking DHT

As these nutrients reach the scalp, the formulation actively clears out cellular damage. The anti-inflammatory gingerols in *Shunthi* (from *Laghu Sutshekhara)* and the steroidal saponins in Shatavari inhibit the NF-κB pathway, blocking the release of destructive cytokines like TNF-alpha and IL-1beta [PMC7667670]. These actions stop the localized inflammation that forces hairs to fall out prematurely. Simultaneously, the potent tannins and eugenol in *Amalaki* and *Lavang* function as natural 5-alpha-reductase inhibitors, lowering local DHT levels to

protect androgen receptors from follicle-shrinking signals. Also, *Shatavari* in *Khalityahara yoga* is a known *Rasayana* (rejuvenative) herb, rich in steroidal saponins which bind to estrogen receptors to help stabilize hormonal fluctuations. *Shatavari* also operates as a potent phytoadaptogen. It systematically regulates the hypothalamic-pituitary-adrenal (HPA) axis, minimizing the systemic release of cortisol. As a result, it prevents stress induced hair fall.

Phase 3: Regenerating the Follicle for Active Growth

With oxidative stress neutralized by *Amla's* antioxidants and stress-induced Substance P blocked by *Kamdudha's* nerve-calming properties, the hair follicle is safely pulled out of its dormant state. The formulation lifts the block on growth factors, allowing the scalp to safely upregulate Vascular Endothelial Growth Factor (VEGF) and Insulin-like Growth Factor-1 (IGF-1). VEGF rebuilds the tiny capillary networks around the hair root to ensure a steady supply of oxygen and blood nutrients, while IGF-1 drives rapid cell division in the hair matrix. This collective synergy corrects the distorted anagen-to-telogen ratio, stops active hair shedding, and triggers robust keratin protein synthesis- physically converting thin, weak vellus hairs back into thick, healthy terminal strands.

CONCLUSION

In conclusion, the clinical efficacy of *Khalityahara Yoga* in treating *Khalitya* lies in its highly coordinated, multi-targeted mechanism that seamlessly bridges ancient humoral principles with modern cellular biology. Rather than relying on a singular pathway, this herbo-mineral formulation operates as a comprehensive therapeutic system. It simultaneously balances the systemic *Doshas- Pitta* and *Kapha* and systematically delivering localized cellular nutrition and powerful anti-inflammatory actions to the scalp microenvironment.

By restoring the gastrointestinal *Agni* and deploying highly bioavailable micronutrients like iron, calcium, and zinc, the treatment effectively feeds the depleted hair matrix cells from within. This nutritional foundation works in perfect tandem with the formulation's ability to deactivate the inflammatory pathway, neutralize oxidative stress, and naturally inhibit the follicle-shrinking 5α-reductase enzyme. Ultimately, this complete systemic and cellular turnaround lifts the block on vital growth factors like VEGF and IGF-1.

By addressing both the internal metabolic root causes and the localized cellular distress signals, *Khalityahara Yoga* successfully extends the active anagen growth phase, arrests rapid shedding, and drives robust keratin synthesis- physically transforming weak, miniaturised vellus hairs back into thick, healthy terminal strands.

To validate this conceptual model, future in-vitro studies should utilize human dermal papilla cells to measure the direct inhibitory concentration (IC50) of *Khalityahara Yoga* against the 5α-reductase type II enzyme and its capability to suppress NF-κB activation. Subsequent in-vivo animal models of stress-induced or androgenic alopecia can track systemic biomarker shifts, specifically quantifying reductions in circulating cortisol and localized Substance P.

Finally, well-designed randomized, double-blind clinical trials should evaluate patient cohorts over a 6-month period using objective trichoscopic assessments. These clinical protocols must correlate improvements in hair shaft diameter and the anagen-to-telogen ratio with systemic improvements in hemoglobin levels and gastrointestinal transit markers. Such a translational approach will definitively establish the therapeutic link between traditional *Agni*-purification and modern follicular growth factor upregulation.

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