

## Overview on Herbal hair growth agent

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Submitted: 25-07-2022

Accepted: 05-08-2022

### ABSTRACT–

Hair is composed of keratin with chemical constituents such as carbon(C), oxygen(O), nitrogen

(N), sulphur(S). Hair can be defined as – improved epithelial structure formed as a result of keratinization of germ native cells. Hair growth varies from person to person but average hair grows about 15-30 mm/month. Hair is one of the virtual parts of the body derived from ectoderm. The treatments offered in this article are natural products to treat the condition of hair loss i.e., alopecia. Nowadays natural products are continuously gaining popularity mainly due to their fewer side effects and better formulation strategies for natural products extract. This review covers information about different types of herbs and their formulations that are believed to be able to reduce the rate of hair loss and stimulate new hair growth.<sup>[1]</sup>

**keywords-** Hair fall, alopecia, hair follicles, herbs, herbal formulations.

### I. INTRODUCTION

Hair can be defined as the improved epithelial structure formed as a result of the keratinization of germ native cells. Hairs are the outgrowths from the follicles present on the skin. Hair is composed of keratin and chemical constituents such as carbon (C), nitrogen (N), sulphur(S) & Oxygen(O). Hair growth varies from person-to-person average hair growth of about 15 to 30mm/month. Hair is one of the virtual parts of the body derived from the ectoderm of the skin. In mammals, hair plays a virtual role in thermal insulation & social-sexual communication, both visually & as a means for dispersing scents secreted by skin glands. Humans are relatively hairless compared to other mammals & human hair has known significance for the survival of species. Hair can be defined in two types as below.<sup>[1]</sup>

### 1. Vellus Hair

### 2. Terminal Hair

> Vellus Hair: - Vellus hair is fine, light colour & straight. Vellus hair is differentiated from the more visible terminal or androgenic hair, which develops only during & after puberty usually to a greater extent in men than does women.

> Terminal Hair: - Terminal hair is thicker, dark & maybe curly on the region of eyelashes & eyebrows. The growth of the terminal is influenced by hormones there are hair follicles over the body. This is the leaving part of the hair. 70-100 hairs loss a day is very common but dropping over 100 hairs a day lasts a couple of weeks indicates a serious problem. Alopecia, a dermatological disorder that has been recognized for more than 2000 years is a common problem in cosmetic as well as primary health care practices. It is common throughout the world & has been estimated to affect between 0.2% & 2 % of the world population. Various synthetic medicines are available for hair loss which does not treat permanently and also shows severe side effects. These problems could be solved by the use of herbal medicines

1. Intraductal

2. Chaitya

3. Palatia

> Intraductal: Intraductal means alopecia areata, alopecia total & alopecia universal.

> Khalitaya: Khalitaya means loss of hair.

> Palitaya: Palitaya means premature hair greying.<sup>[2]</sup>

### HAIR AND HAIR GROWTH CYCLE

The appearance and morphology of the hair are regarded as one of the divergent traits of the population. Hair is a protein filament (protein filament is a long chain of protein monomers, such as those found in hair, muscle, or flagella. Protein filaments form together to make the cytoskeleton of the cell.). Hair is one of the defining characteristics of mammals. The word "hair" usually refers to two distinct structures: The part beneath the skin, called

the hair follicle, or, when pulled from the skin, the bulb or root. This organ is located in the dermis and maintains stem cells, which not only regrow the hair after it falls out but also are recruited to regrow skin after a wound. The hair shaft, is the hard filamentous part that extends above the skin surface. The cross-section of the hair shaft may be divided roughly into three zones. Hair fibres have a structure consisting of several layers, starting from the outside:<sup>[4]</sup>

1. The cuticle consists of several layers of flat, thin cells laid out overlapping one another as roof shingles.
2. The cortex contains the keratin bundles in cell structures that remain roughly rod-like.
3. The medulla is a disorganized and open area at the centre.

**HAIR GROWTH CYCLE: -**

Hair growth happens in a cyclical process in your hair follicles. The cycle consists of four phases. The whole cycle lasts for a few years for each of your hair strands on the scalp

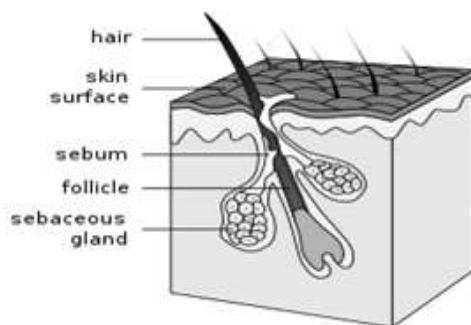


Fig (2): - Hair follicle

Hair growth happens in a cyclical process in your hair follicles. The cycle consists of four phases. The whole cycle lasts for a few years for each of your hair strands on the scalp.

The four phases are :-

1. Anagen (growth)
2. Catagen (regression/transition)
3. Telogen (rest)
4. Exogen (shedding)

The hair follicle regulates hair growth via a complex interaction between hormones, neuropeptides, and immune cells. This complex interaction induces the hair follicle to produce different types of hair as seen on different parts of the body.

Anagen Phase: -

During anagen phase, the stem cells of the dermal papilla multiply to produce hair protein and fibres. The span of the anagen phase lasts from 2-7 years depending upon your genetics and various internal and external factors, while it determines the length of that hair strand. Sometimes, external factors like chemotherapy drugs, radiotherapy, oral contraceptives, vitamin A poisoning, chronic infections, other chemicals, etc. can result in an abnormal ending of the anagen phase. This condition is termed as 'Anagen Effluvium'. In Ayurvedic terms, the anagen phase can be correlated to Kapha Kala during hair grows steadily for a longer period.

Catagen Phase: -

By the end of the anagen phase, your hair strand enters the catagen phase naturally during which it gets detached from the root. During the catagen phase, hair follicle renews itself by shrinking to 1/6th of its length and the papilla rests. In Ayurvedic terms, catagen phase can be correlated to Pitta Kala during which regression of hair growth occurs.

3. Telogen Phase: - By the end of the catagen phase, your hair strand becomes a club and the dormant resting phase, telogen begins. Telogen phase lasts for 3-5 months during which a new hair emerges from the roots and slowly pushes up the previous club hair. This phase is closely related to Vata Kala in Ayurveda.

4. Exogen Phase: - It is the last phase of the hair growth cycle when the hair strand completely detaches from the scalp and sheds off. This is the hair that you notice falling out while you comb or brush

every day as around 50-100 strands undergo exogen phase daily naturally.<sup>[4]</sup>



Fig (3): Hair growth cycle

**TYPES OF HAIR LOSS**

There are eight types of hair loss as below

- A. Alopecia areata (prime stage).
- B. Temporary alopecia aerata.
- C. Alopecia totalis.
- D. Alopecia universals.
- E. Traction alopecia.
- F. Chemotherapy & hair loss.
- G. Diffuse alopecia.
- A. Alopecia areata (prime stage):

Alopecia areata is a common autoimmune disease that result in the loss of hair on the scalp &else where it usually starts with one or more small round, nonscarring smooth. Mild brief. Alopecia areata patient with repeated transit.

**B. Temporary alopecia areata:**  
 Temporary alopecia areata means patient with alopecia areata in advance phase & some of themconverts into alopecia totalis/ alopecia universals.

**C. Alopecia totalis:**  
 Alopecia totalis means the loss of hair from whole scalp.

**D. Alopecia universals:**  
 Alopecia universals means the loss of hair from entire body including eye brows & eyelashesscarring Alopecia anyinflammatory process (burns, bacterial, infections, ringworm, injury)necessary to cause permanent loss of follicles affected area known as scarring Alopecia.

**E. Traction alopecia:**

Traction alopecia means the hair elegance that tie hairs so tight can causes much traction at the root of hairs & also can be develops adhesion alopecia.

**F. Chemotherapy & hair loss:**  
 Chemotherapy is an exclusive behaviour for cancer patients but is mark normal cells & hair follicles to this causes hair loss & knows as anagen effluvium type of alopecia.

**G. Diffuse alopecia:**  
 Diffuse alopecia un-necessary loss of hair all over the scalp without creating reinforcement. Hair loss due to side effects of the beauty treatments any beauty treatments any hair colours, die, straightening, softening, rebounding, perming Etc. Which contacts harsh chemical can trigger hair loss for some individuals? Telogen effluvium's (TE) & chronic telogen effluvium's (CTE) dietary lacks, crash dieting high grade fever, anaemia, blood loss, hormonal imbalance &pregnancy Can cause telogen effluvium's types of hair loss telogen word is known for latent phase of the hair.<sup>[3]</sup>

**DISORDERS OF HAIR<sup>[5]</sup>**

The main problems associated with hairs are

- 1.pigmentation (fading)
- 2.dandruff
3. falling of hairs (shedding) and
- 4.balding

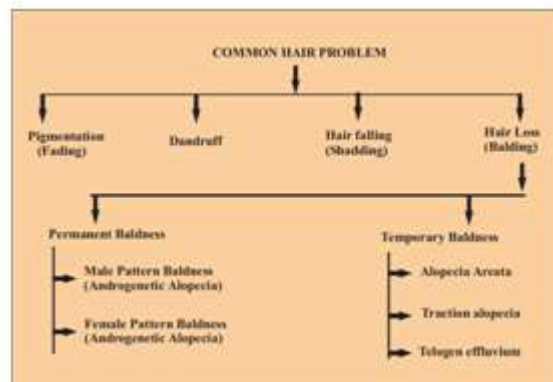


Fig (4): Common hair problems

DISEASE	ETIOLOGY	CLINICAL	TREATMENT
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Telogen effluvium	Shedding of telogen hairs (no scars), Secondary to Stress like high fever, surgery, crash diet	Uniform decrease in density all over scalp, Positive hair pull test	Shampoo less frequently. Can get up to years to grow back
Traction alopecia	Hair styling like Pony tails.		Hair grafts
Alopecia Areata	Genetic Factor, Autoimmune disease	Circular patches of hair loss, Hairs grow back white	Inject steroid (Kenalog)

Table (1): - Common disorders of hair

**COMMON HAIR DISORDERS**

1. Telogen effluvium: -



Fig: - Telogen effluvium

Telogen effluvium arises when the hair cycle has sped up so that the anagen phase is shorter; identify and treat iron deficiency (test ferritin) and hypothyroidism. it is rare in children; most cases are women with diffuse non-androgenic pattern balding.

2. Traction alopecia: -



Fig: - Traction alopecia

Traction alopecia is a form of alopecia, or gradual hair loss, caused primarily by pulling force being applied to the hair.

3. Alopecia Areata: -



Fig: - Alopecia Areata

Alopecia areata, also known as spot baldness, is a condition in which hair is lost from some or all areas of the body

4. Androgenic Alopecia:-





Fig: - Androgenic Alopecia

The term androgenetic alopecia is often used to describe the patterned loss of scalp hair in genetically susceptible men and women. In androgenetic alopecia, shortening of the anagen phase takes place that result into conversion of thin terminal hairs into fine vellus hairs.

6. Pigmentation (Fading): -



Fig: - Hair pigmentation

The tight coupling of hair follicle melanogenesis to the hair growth cycle dramatically distinguishes follicular melanogenesis from the continuous melanogenesis of the epidermis. Cyclic re-construction of an intact hair follicle pigmentary unit occurs optimally in all scalp hair follicles during only the first 10 hair cycles, i.e., by approximately 40 years of age. Thereafter there appears to be a genetically regulated exhaustion of the pigmentary potential of each individual hair follicle leading to the formation of true grey and white hair. Pigment dilution results primarily from a reduction in tyrosinase activity within hair bulbar melanocytes. Thereafter, sub-optimal melanocyte-cortical keratinocyte interactions, and defective migration of melanocytes from a reservoir in the upper outer root sheath to the pigment-permitting microenvironment close to the follicular papilla of the hair bulb, will all disrupt normal function of the pigmentary unit.<sup>[6]</sup>

7. Dandruff: -



Fig: - Dandruff

Dandruff is a common scalp disorder affecting almost half of the post pubertal population of any ethnicity and both genders. It may, however, represent a stubborn esthetical disturbance often source of pruritus. Skin biocenosis, in particular the *Malassezia* spp. flora, plays a key aetiologic role, in combination with the unusual capacity of some corneocytes to be coated by these yeasts. Substantial evidence indicates that keratinocytes play an active role in the generation and expression of immunopathological reactions. This is probably the case in dandruff. Upon stimulation of a critical colonization of corneocytes by *Malassezia* yeasts, the release of pro-inflammatory mediators is increased. This could lead to the subclinical microinflammation present in dandruff. Dandruff can precipitate telogen effluvium and exacerbate androgenic alopecia. Antidandruff formulations exhibiting some direct or indirect anti-inflammatory activity can improve both dandruff and its subsequent hair cycle disturbance.<sup>[7]</sup>

8. Hair Falling (Shading):-



Fig: - Hair Falling (Shading)

Hair falls out and grows in every day, but sometimes the fact that you have hair falling out can be the indicator of a greater health problem. Every day, we lose between 50 -100 hairs and it's completely normal. Hairs have different phases: some are growing, some

are stable, and others are ready to fall out. Although there are many reasons as to why hair would fall out, some that could be because of specific problems, such as:<sup>[8]</sup>

- Poor diet
- Hormonal changes
- Blocked hair follicles

#### SYMPTOMS OF HAIR LOSS: -

There are many factors for hair loss. The main problems associated with hairs are dandruff, pigmentation (fading), falling of hairs (shedding), and balding. Some follow-<sup>[9]</sup>

Hairstyling products

- Chemicals (hair dyes)
- Hairstyling techniques
- Diabetes
- High iron deficiency
- Nutritional deficiency
- Other fungal infections
- Physical trauma to the scalp
- Poor blood circulation
- Stress
- Skin diseases
- Poisons
- Sudden weight loss
- Surgery
- Acute illness
- Autoimmune disorders

#### THE HERBS USED IN THE TREATMENT OF ALOPECIA PROVIDE ARE ONE OF THE FOLLOWING –

1. Aromatherapy and improved scalp blood circulation
2. Nutritional support
3. DHT blockers and 5- $\alpha$ -Reductase blockers

Aromatherapy – This therapy can be used as a supplement to treat alopecia. It uses highly concentrated extracts which are derived from the flowers, leaves, bark and the roots of various plants like Arnica Montana, Cedrus Atlantic, Oscimum sanctum, Pilocarpus jaborandi, Rosmarinus officianalis, Thyme vulgaris etc., In aromatherapy the essential oils enter the body through the olfactory system (inhalation) and through the skin. Herbs that are taken orally the essential oils reach the circulatory system (blood) where they bind to receptor and change the chemical composition. Topical herbal

therapy stimulates hair follicles and it is proved as safest way to cope up with different type of hair loss (alopecia)

2) Nutritional support – Mineral deficiency will reduce the chance to regulate the blood circulation that promotes healthy hair growth and thyroid hormones that prevent dry hair and hair loss as well as defects in hair colour. Mineral such as calcium, copper, iodine, magnesium, chromium, zinc is necessary to maintain healthy hair growth. Too much iron is toxic to your body so be sure to talk to your doctor before taking any mineral supplement Vitamin A is important for overall good health it's also beneficial to hair follicles, it keeps the hair root lubricated. Carrots contain high amounts of vitamin A. It is an antioxidant that helps to produce healthy sebum in the scalp. Having too much vitamin A can lead to their loss. Vitamin E acts as an antioxidant that aids to real circulation in the scalp due to increased oxygen uptake in blood so it plays important role in promoting hair growth and preventing hair loss.

3) DHT blockers and 5- $\alpha$ -Reductase blockers: - There are some herbs that have proved DHT blocking activity like pygeum, africanum, seneroa repens, urtica dioica, and others with potential 5- $\alpha$ -reductase inhibiting ability like camellia sinesis, panax ginseng, etc.<sup>[10]</sup>

#### HERBS USED IN THE TREATMENT OF ALOPECIA –<sup>[10,11]</sup>

A. Amla (Emblca Officinalis) – It belongs to the family Euphorbiaceae

Amla Synonyms- Indian gooseberry, Amalki

Chemical constituents – vitamin C, phyllembin, tannin, phosphorus, iron, calcium Parts used – fresh and dried fruits

Mode of application – amla oil is prepared by boiling dry pieces of Indian gooseberry in coconut oil is considered a valuable hair tonic for enhancing hair growth. A mixture of equal quantity of fresh Indian gooseberry and lime juice is used as a shampoo .it also

stimulates hair growth and prevents hair loss

Reason- the iron in amla involved in the oxygenation of our body's red cells it is essential for normal hair growth and maintaining healthy hair growth Formulations – hair oil, shampoo, hair tonic



Fig: - Amla (Fruit)

A. Onion (*Allium cepa*)- it belongs to the family- Liliaceae

Synonyms- bulb onion, common onion

Chemical constituents- allicin, alliin, diallyl sulphone, disulphide, allyl propyl, protein (albumin).it also contains some minerals like potassium, zinc, magnesium and traces of chromium

Parts used- stem

Mode of application - Onion has also been found beneficial in patchy baldness. the affected part should be rubbed with onion juice morning and evening till it is red .it should be rubbed with honey afterwards. Reason - Iron is involved in the oxygenation of our body's red bloodcells.it is essential for normal hair growth and maintaining healthy hair. Zinc helps to secrete the scalp with much needed oil and it avoids Dandruff that may cause hair loss

Formulations - Hair oil, shampoo.



Fig: - Onion stem and root

B. Aloe (*Aloe barbadensis*) - It belongs to the

Family Liliaceae

Synonyms - Kumari, Musabbar

Chemical constituents - Aloe is a major source of anthraquinone glycosides. It consists Barbaloin and Aloe - Emodin

Parts used - dried juice of leaves

Reason - Aloe vera contains vitamin A, C and E, which contribute to cell turnover promoting healthy cell growth and shiny hair. It reduces the dandruff and unblock hair follicles that may block the excess oil. Aloe vera soothes the scalp and conditions hair. It has long been used for treating hair loss

Formulations - Hair oil, Hair shampoo, Hair mask



Fig: - Aloe

D. Ashwagandha (*Withaniasomnifera*) - It belongs to the family Solanaceae

Synonyms - Indian ginseng, Winter cherry, Asgandha

Chemical constituents - Ashwagandha contains alkaloids and steroidal lactones, withanine, somniferine

Parts used - roots, leaves

Reason - Ashwagandha stimulates the production of DHEA (Dehydroepiandrosterone), a natural hormone in your body which promotes hair growth. Thus, Ashwagandha helps you combat free radicals from your scalp and hair follicles. It promotes the healthy hair growth.

Amino acids in Ashwagandha can help to strengthen the hair Formulations - Hair oil, Hair mask



Fig: - Ashwagandha

E. Bhringa Raj (*Eclipta alba*) - It belongs to the family Asteraceae

Synonyms - False daisy, Karisalankanni, Maka

Chemical constituents - Bhringa Raj contains alkaloid ecliptine and flavonoids wedelolactone. It consists apigenin, wedelic acid, glycosides, resin

Parts used - leaves, roots

Reason - Bhringa Raj oil alleviates inflammation when massaged into the scalp. It increases the thickness and luster of hair. It is a potent hair vitalizer has a host of bioactive constituents like flavonoids. Bhringa Raj plays a vital role in treating and preventing baldness. It increases blood circulation in the scalp and hair follicles. It treats the dandruff due to its powerful anti-microbial and

anti-bacterial properties. Active constituents of Bhringa Raj hair oil contain haritalci and jatmanshi which is extremely beneficial in maintaining the natural color of hair and prevent premature greying  
Formulations - Hair oil, shampoo



Fig: -Bhringa Raj

F. Brahmi (*Bacopa monnieri*) - It belongs to the family Scrophulariaceae

Synonyms – Bacopa

Chemical constituents - Brahmi contains brahmine, herpestine, hersaponin, monnierin (saponin), bacoside A and B

Parts used - roots, leaves, flowers

Reason - Brahmi reduces dryness, itchiness and flakiness. It helps in reducing hair fall to a considerable amount and also boosts hair growth at the same time. The antioxidant components in Brahmi helps in rejuvenating scalp. It moisturizes the scalp and turns it healthier. Brahmi thickens hair and prevents split ends

Formulations - Hair oil, shampoo



Fig: - Brahmi

H. Jatmanshi (*Nardostachys jatmanshi*) - It belongs to the family Valerianaceae

Synonyms - Indian spike nard, Nard

Chemical constituents - Jatmanshi contains resin, sugar, starch and alcohol. It consists of pale-yellow volatile oil contains jatmansic acid and ketones jatmansone and nardostachone

Parts used - rhizomes

Reason - Jatmanshi increases the size of the hair follicles and extends the phase of hair growth. The increase in hair follicle size leads to stronger and thicker hair strands. The oily

and healing properties of jatmanshi helps in curing hair falls and promotes hair growth. Jatmanshi helps in darkening hair color. It makes hair soft and silky. It helps in reduce dandruff and prevents split ends  
Formulations - Hair oil, hair dye, hair pack



Fig: - Jatmanshi (Rhizomes)

I. Tulsi (*Ocimum sanctum*) - It belongs to the family Lamiaceae

Synonyms - Holy basil

Chemical constituents - Tulsi contains caryophyllin, alkaloids, glycosides, and vitamin

It consists yellow coloured and pleasant volatile oil. It also contains eugenol, carvacrol and eugenol-methyl-ether

Parts used – leaves

Reason - Tulsi is one stop solution to treat all the scalp infections and get rid of hair fall. The anti-bacterial and anti-fungal benefits of basil help to keep the scalp healthy and anti-inflammatory properties gives relief from dryness and itchiness of the scalp. Basil helps in improving blood circulation in the scalp that leads to optimal nourishment of hair follicles. The antioxidant present in Tulsi is very useful in treating premature greying of hair  
Formulations - Hair oil, hair wash powder, shampoo



Fig: -Tulsi (Leaves)

Neem (*Azadirachta indica*) - It belongs to the family Meliaceae

Synonyms – Margosa

Chemical constituents - Neem contains fatty acids like oleic and stearic acid. Neem also consists glycerides of saturated and unsaturated fatty acids



Parts used - leaves, barks

Reason - The antifungal properties of Neem help to treat dandruff. The effective use of Neem to hair can relieve the itches, inflammation and irritation. The regenerative properties of Neem help in reducing hair fall. It increases the blood circulation in the scalp and help in enhancing the speed of hair growth. Neem consists the ingredients like fatty acids (linoleic, oleic and stearic acid) which help the scalp to nourish there by keeping the hair smooth. The antioxidant properties of Neem curb the action of free radicals that causes premature greying of hair

Formulations - Hair oil, shampoo, hair mask



Fig: - Neem (Bark, Leaves)

**MECHANISM OF ACTION OF HERBS FOR HAIR GROWTH.**

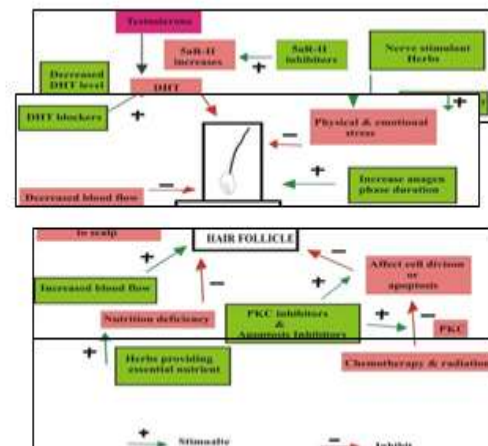










Fig: - Different Mechanism of action of herbs for hair growth.

**AYURVEDIC CLAIM OF HAIR GROWTH ACTIVITY: -**

Ayurveda is the traditional medicinal system of India and believed to have originate over 6000 years ago. It describes the ways to remain healthy as well as methods to treat disease. Some plants and their mixture mentioned in Charak Samhita, Sharangdhara Samhita, Grantha sayare traditionally used in treatment of Khalitya (Alopecia), and Indralupta (Baldness).<sup>[12][15]</sup>

Indian vernacular name	Botanical name	Family Parts	Parts used	Image
Harad	Terminalia chebulica Retz.	Combretaceae	Fruits	
Mulethi	Glycyrrhiza glabra L.	Fabaceae	Root	
Bahede	Terminalia bellerica (Gaertn.)	Combretaceae	Fruits	

Manjistha (Indian Madder)	Rubiacardiolia L.	Rubiaceae	Leaves	
Mallika	Jasminum officinale L.	Oleaceae	Leaves	
Devdaru	Cedrus Deodara (Roxb.) Polyalthia longifolia Sonn	Pinaceae	Annona ce e Leaves	
Sahchar	Calacanthus grandiflorus Mill	Acanthaceae	Leaves	
Makoy	Solanum nigrum L.	Solanaceae	Berries	

**HERBAL FORMULATION: -**

Herbal formulation is the use of more than one herb in a medicinal preparation. The concept is found in Ayurvedic and other traditional

medicinal systems where multiple herbs in a particular ratio may be used in the treatment of illness.<sup>[13]</sup>

Sr. No	Manufacture Formulation Content	Product name
1	Amla, Bringgraj	Keshamrit Oil
2	Bhringgraj, Godanti	Nutrich Capsule
3	Vacha, Jevanti	Keshmitra Tablet
4	Bhringgraj, Godanti	Nutrich Capsule
5	Tulsi, Neem	Sidha Shampoo

6	Chamomile, Rosemary	Regrow Massage Oil
7	Amla, Bhringraj	Saini Herbal Hair Conditioner
8	Amla, Heena	Shyamla Shampoo
9	Ashwagandha, Shatawari	Kesh Vardan Capsule
10	Hibiscus rosa sinensis, E. alba, O. sanctum	Hairich Capsule & Oil
11	Amla, Bhringaraj, Brahmi	Chirayu Herbal Oil

## II. CONCLUSION: -

In the present project, an attempt has been made to emphasize on herbal option for treatment of hair loss. Hair loss occurs due to various reasons mentioned in the project. Hair loss is common and ever-increasing problems in cosmetics as well as primary health care practice. Hair loss sufferers spend billions of dollars annually on remedies ranging from drugs, vitamins to special tonics and shampoos. Many will try anything and everything to bring back their looks. Herbal drugs provide a new revolution for hair growth. In this project, we summarized some of the herbs that are believed to reduce the rate of hair loss and at the same time stimulates new hair growth. This article also covers the mechanism of hair growth, increased blood supply, prolongation of anagen phase, follicular enlargement and aromatherapy by which some plant extracts which inhibits the hair loss or promote hair growth. The project may facilitate the case and cause of natural remedies for the distressing and disturbing problem of hair loss to world community. <sup>[16]</sup>

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