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Review Article

ALOPECIA- FACTORS CONTRIBUTING, DIAGNOSIS AND TREATMENT

Harpreet Kaur*, Saurav Kumar, Gurpreet Kaur, Maninderjit Kaur and MS. Rathore

C T Institute of Pharmaceutical Sciences, Shahpur, Jalandhar, Punjab, India.

ABSTRACT

Hair suffers aggression; there can be some aliments to normal health of hair and cause trouble. The main problems associated with hair are pigmentation problems (Fading), dandruff and falling of hair (Shedding). Shedding of hair is a common and ever increasing problem in cosmetics as well as primary health care practice. It is a universal problem, having affected both sexes of all races to different extents for as long as mankind has existed. Hair loss sufferers spend billion of dollar annually on remedies ranging from drugs, vitamins to special tonics and shampoos. Conventional treatments of hair thinning includes drugs therapy and hair transplant. Minoxidil and Propecia (Finasteride) are the only two drugs approved by the FDA for hair growth in men. Minoxidil is the only drug available for women with androgenetic alopecia. These drugs have been proven to show positive results for balding conditions on the vertex region of the scalp. Though these drugs are effective, many are wary of their unknown long-term effect and potential side-effects. This has led to increase interest in alternative remedies such as herbal medicine.

Keywords: alopecia, cyclic phase, diagnosis, factors contributing, treatment.

INTRODUCTION

Hair is one of the vital parts of the body derived from the ectoderm of skin, is protective appendages on the body and considered accessory structure of the integument along with sebaceous glands, sweat glands and nails. Each hair grows in three cyclic phases[1, 2]:

1. **Anagen (Growth phase) –** The anagen phase can be short as 2 years to as long as 8 years. Approximately 80 % of hair is usually in anagen phase. During this phase the epidermal cells are constantly dividing, and as new cells are formed they push the older ones upward where they begin to change shape. By the time the cells are about one-third of the way up the follicle they are dead and fully keratinized. A scalp hair will grow actively for between one and half and seven years.
2. **Catagen (Involution) –** This is the end of the active growth period and hair moves to the next phase. Catagen phase is between 10-14 days. The hair stops growing and becomes detached from the base of the follicle forming a club hair. The hair bulb begins to break down, resulting in the follicle becoming shorter. A small section of the outer root sheath remains in contact with the group of cells that formed the papilla. As the inner root sheath breaks down, the hair remains in the follicle due to its shape.
3. **Telogen (Resting phase) –** The telogen phase is a state at which the hairs move into resting state. This phase lasts for 90-100 days. The section of the remaining root sheath still in contact with the papilla is known as the secondary or root germ. It is from this germ that a new hair can grow. On average 14% of follicles are in the telogen stage.

After the telogen stage the cycle returns to anagen and the root germ begins to grow downwards and form the new bulb, producing a new hair. The upper part of the germ forms the new cells that lengthen the

follicle below the club hair. The new hair may push the old hair out.

In general, 50-100 hairs at random are shed every day. An increase in more than 100 hairs per day along with the thinning of hair on scalp constituents a state of hair loss or alopecia. Alopecia can be further classified as follow[3]

a) **Androgenetic alopecia**- In this hair loss can start as early as late adolescence. Androgenetic alopecia can vary in its severity from merely accentuated recession of the frontal hairline to loss of all hair except along the temporal and occipital margins. In females, the condition is usually milder and is associated with diffuse thinning of scalp hair.
b) **Alopecia areata**- It typically presents with sudden hair loss causing patches to appear on the scalp or other areas of the body., which is referred to as
c) **Alopecia totalis** – If alopecia areata is left untreated, or if the disease does not respond to treatment, complete baldness can result in the affected area
d) **Alopecia universalis**-When the entire body suffers from complete hair loss, it is referred to as alopecia universalis.

FACTORS CONTRIBUTING TO HAIR FALL[4]

Hair loss causes are quite controversial issue as there is no general agreement about what are the main factors that causes hair loss. There may be one or multiple factors leading to hair loss, which may be summarized as follows;

- Local Factors
- General Factors
- Psychological factors
- Liver -Toxins

1. Local factors

Some of the local factors or conditions associated with hair loss are:

(a) Leaky Gut Syndrome

Certain local skin ailments are known to lead to hair loss. Local skin infections such as overgrowth of C-albicans which include; fungal forms, metal toxicity, mycoplasma infections or, what we refer to as "vague and inconsistent symptoms" are at the root cause for all chronic illness known as autoimmune disorders. Autoimmune disorders known as mycoplasmas or ""Cell Wall Deficient Forms"" - the ""Stealth Pathogens"", are the underlying cause(s) of a myriad of conditions including; eczema, psoriasis, fogging brain, memory loss, lethargy, forgetfulness, ADD/ADHD, Chlymadia, Arthritis, Rheumatoid Arthritis, Osteoarthritis, MS, Lupus, ALS, Lyme Disease, Diverticulitis, Crohn's Disease, Irritable Bowel Syndrome, Gastritis, Colitis, athletes foot, chronic yeast infections, ""jock itch"", yellowing toe nails and/or fingernails, itchy scalp (see parasite booklet) onset of peculiar vision symptoms, bad breath, all digestive disorders and more are 'all' contributory factors to any 'vague and inconsistent' condition usually missed by conventional medicine.

(b) Local exposure to toxins

Overuse or abuse with chemical based shampoos, soaps, and lotions can be one factor in hair loss.

(c) Scalp carelessness

Unhygienic measures in scalp care may lead to air loss. For instance, infrequent head wash, over exposure to harsh sun without protection, exposing the head to industrial fumes.

2. General factors

(a) Deficient Nutrition

Overall deficiency of nutrition may affect the growth and quality of hair. Deficiency of certain vitamin B's, vitamin A, may also lead to hair loss (or too much vitamin A as well). The deficiency in proteins, iron, especially minerals, may affect hair loss including short to long term alopecia. Iron deficiency in most cases is due to an overabundance candidiasis/fungal forms. B-12 while important to our health can be chelated (pulled out) from the red blood cells due to certain microorganisms feeding on this vitamin. In short, spherocytosis results and can lead to hemolytic anemia. Other symptoms can include excessive bleeding (if client is taking Warfarin or Coumidin) - these are dangerous blood thinners- (rat poison). This is another contributory factor in loss of iron - leading to anemia. One must be under the care of a nutritionist with knowledge in these potentially dangerous drugs. These drugs (chemicals) result in potential mal-assimilation or a mal-absorption syndrome. It may occur following any prolonged acute or sub-acute disease such as cystitis, colitis, chronic acid reflux, Irritable Bowel Syndrome; the list goes on! These digestive disorders are all linked to pleomorphic bacteria, or better known as Mycoplasma Infections plus the overgrowth of C-albicans and fungal forms. These pathogens are conditions mainstream medicine usually do not give much, if any attention to, yet, are usually the result of over-use of pharmaceuticals, leading to

chemical sensitivities resulting from heavy metal toxicity (can be job related as working in a lab in which one handles chemicals without wearing proper laboratory attire) and, the over-use of antibiotics.

(b) Hormonal variations

Certain hormones including androgen, estrogen and in most cases the lack of progesterone causes variations during different phases in life may contribute to excessive hair loss. (See the Booklet on the necessity for progesterone, like Nature's Balance ProgesternoCreme!) Thyroid hormones form another important group of disorders responsible for hair loss in some cases. Post-partum depression and child-birth is another example due to the loss of progesterone. This a huge factor most women only blame on depression alone due to the realization this ""little bundle of joy"" has now added 'good stress' along with the word, "Stress"!

(c) Post-acute-ailment

Certain "acute" diseases result in a Compromised Immune System and may result in the loss of hair. Again, this cannot be overstated; Overgrowth of Candida, or C-albicans, fungus, metal toxicity and bacterial forms can either all by themselves or all together (usually this is the case) set one up for the inability of the immune system to function normally creating the mal-absorption of the body's ability to function. A total depletion of minerals, enzymes, antioxidants, essential fatty acids and hormones results in hair loss. As an aside, the loss or thinning of eyelashes and pubic hair can be a 'subtle' hair loss condition as well and points in the direction of hormonal imbalance.

(d) Medicine and Drug induced

Certain chemicals and medicines (prescription drugs) have known toxicity on the hair roots and growth. Long term use of chemotherapy, cancer medication, steroids, antibiotics, antiepileptic, antihypertensive medications to name a few, have been observed to produce hair loss in some patients. Don't forget to include the use of the birth control pill which creates "Estrogen Dominance" and, throws of the delicate balance of testosterone, and progesterone again, contributing to the loss of hair.

3. Psychological factors

The mind plays a vital role in maintaining the health in general developing a wide range of disorders.

Some of the examples of emotional stress may be summarized in brief as follows;

a) Intense anxiety about any important matter

Sadness or depression in one's life, which may be arising from marital disharmony or job dissatisfaction results in tremendous stress that contributes to a dysfunctional social structure. Grief due to an unexpected event in one's life such as loss of a family member, loss in business, a major setback in life, including a long-standing fear and apprehensive habits. Unhealthy attitudes such as aggressive behavior, violent expressions, hurried and impatient behavior, can be contributing factors.

(b) Emotional stress

Emotional stress is an epidemic condition prevailing in the world today.

Worrying about anything, anyone or just about everything sets us up for the disorder affecting the physiological functioning of every part of our immune system including "hair loss". Simply, the loss of hair is a 'sign' that there's something out of balance within the immune system!

In a nutshell, *stress* resulting in the aforementioned health conditions and personality type may play a larger role than suspected or recognized in the resulting of hair loss, therefore, the major criterion to decide the correct line of treatment for hair loss.

4. Toxins residing in the liver

The most common factors include; industrial toxins, intoxicated water (with high levels or minerals and metals), local dermal infection, parasitic infestation and local allergic ailments. Liver toxicity may be the most important reason for this condition, and a liver cleanse would be highly recommended.

DIAGNOSIS

The difficult task in diagnosing hair and hair disorders is to distinguish between a true disorder and a subjective complaint and to analyze the underlying pathogenesis. Patients consult for focal or diffuse effluvium, non-scarring or scarring alopecia, changes in hair structure or color and hair graying. Establishing the correct diagnosis is the key feature of successfully managing a hair patient.[5]

Numerous methods have been reported to evaluate causative disorders:

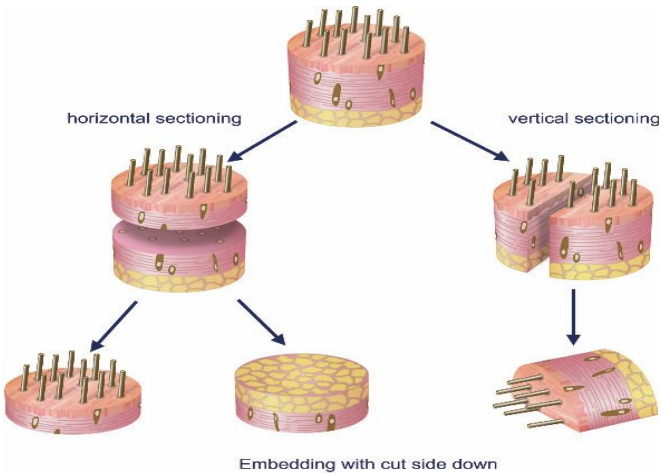
1. **The Pull Test**- The pull test helps to roughly estimate the severity of hair loss

in daily practice. Its range of application in the diagnostic process reaches from androgenetic alopecia and alopecia areata.

A bundle of about 50–60 hairs is grasped between the thumb, index finger, and middle finger from the base near the scalp. The hair is firmly, but not forcibly, tugged away from the scalp as fingers slide along the hair shaft. Another procedure is to use both hands, and grasp a tuft of hair between two fingers of one hand and pull at it with the other. Afterwards the number of extracted hairs is counted and, depending on the diagnosis, sometimes examined under the microscope, e.g., in loose anagen hair. If more than 10% of grasped hairs, or six hairs, are pulled away from the scalp, this constitutes a positive pull test and implies active hair shedding.[6]

2. **The Pluck Test (Trichogram)**- To perform the pluck test, hairs are taken from specified sites on the fifth day after the last shampoo. The surrounding hairs are fixed with clips and 60-80 hairs are grasped with a hemostat covered with rubber. The hairs are plucked, twisting and lifting the hair shafts rapidly in the direction of immergence from the scalp. Hair shafts are then cut off 1 cm above the root sheaths and roots are arranged side by side on a slide and then taped. The anagen hair bulbs are seen as darkly pigmented triangular or delta-shaped bulbs with an angle to the hair shaft and there is presence of inner root sheath. The telogen hair is seen as less-pigmented hair with club-shaped hair bulb and there is absence of inner root sheath. Anagen hairs are distinguished from telogen hairs and anagen to telogen ratios are calculated.[5]
3. **Scalp biopsy**- This test is done when alopecia is present, but the diagnosis is unsure. The biopsy allows for differing between scarring and non-scarring forms. Hair samples are taken from areas of inflammation, usually around the border of the bald patch.[3]

The scalp biopsy, mostly performed with a 4-mm cylindrical punch, is an important tool in the diagnosis of alopecia. The 4-mm cylindrical punch is inserted into the scalp parallel to the direction of hair growth, with rotary cutting motion through the dermis down into the fat in such a way that entire bulbs of engrained terminal hairs can be extracted and the hairs are pointing straight upward at 90°. Afterwards the biopsy sites can be sutured with a 3-0 non-absorbable fiber. Usually, two specimens are collected from the involved area: one for horizontal sectioning and one for routine vertical sectioning. If a specimen is needed for direct immunofluorescence study, the "vertical plug" is bisected before formalin fixation and one hemisection prepared for direct immunofluorescence in appropriate fixative; if possible, an additional specimen is collected from a clinically uninvolved site (usually the occiput) and processed for horizontal sections to allow comparison with affected areas.[6]



4. **Daily Hair Count**-This is normally done when the pull test is negative. It is done by counting the number of hairs lost. The hairs that should be counted are the hairs from the first morning combing or during washing. The hair is collected in a clear plastic bag for 14 days. The strands are recorded. If the hair count is >100/day, it is considered abnormal except after shampooing, where hair counts will be up to 250 and be normal.[3]
5. **Trichoscopy-** It is a noninvasive method of examining hair and scalp. The test may be performed with the use of a handheld dermoscope or a video dermoscope. It allows differential diagnosis of hair loss in most cases.[3]

TREATMENT FOR ALOPECIA

- **Synthetic Drugs**

1. **Minoxidil(Rogaine):** Minoxidil, a pyrimidine derivative (2,4-diamino- 6-piperidinopyrimidine-3-oxide), was the first drug to become available for treating scalp hair loss. The mechanism(s) by which minoxidil promotes hair growth is still not fully understood, and multiple pathways are thought to be involved. One theory proposes that minoxidil, metabolised to minoxidil sulfate in the hair follicles, acts as a potassium channel agonist to reduce the cytoplasmic free Ca2+ concentration. This prevents epidermal growth factor from inhibiting hair formation. Thus, hair growth is promoted. Another possibility is that minoxidil up-regulates the expression of vascular endothelial growth factor and its receptors – an action which subsequently stimulates angiogenesis and anagen. In clinical practice, minoxidil appears to be more effective in women than in men. This may be because besides augmenting the number of hairs, the drug also increases the hair shaft diameter, which in a woman's long hair is of particular cosmetic benefit. Minoxidil is available in a 2 percent solution and in a 5 percent solution. The makers of minoxidil recommend women only use the 2% concentration of minoxidil because they have not received FDA approval for promoting 5% minoxidil or minoxidil extra strength for use by women. Topical minoxidil is much more effective at treating baldness that occurs on the top, or crown, of the head than it is at causing hair growth on other parts of the head. There are many disadvantages of monoxidil;[7]
   - High cost of minoxidil is one of the major disadvantages.
   - It can occasionally cause **facial hypertrichosis** – an effect produced either systemically or possibly by manual drug transfer. This facial hair growth disappears after cessation of treatment.
   - Limited effectiveness. The treatment does not work on everybody with thinning hair due to inherited pattern hair loss. It is less effective for hair loss at the hairline than on the top of the head. It is less effective on large bald spots than small ones.
   - It is not a cure for hair loss. It will only work over the long term if continue using it. If stop using you will likely lose any hair you have gained.

2. **Finasteride(Propecia):** Finasteride has been available since 1997 and is the first and only oral medication approved by the FDA for the treatment of male pattern hair loss. It has not been proven effective in women and is not approved for women.[8] Finasteride, a synthetic 4-azasteroid compound, is a specific inhibitor of type II, 5-α reductase. This intracellular enzyme converts testosterone into dihydrotestosterone which affects hair follicle regression. By reducing scalp tissue levels of dihydrotestosterone, finasteride treatment suppresses male pattern hair shedding.[16] Main disadvantages of Finasteride are follow:[16]
   - Continual use of the drug is necessary if the cosmetic benefit is to be sustained, since the drug does not cure the underlying genetic causes of the alopecia, ceasing daily administration results in the shedding of regrown hairs and the resumption of balding.

- This agent is not licensed for use by women because of the potentially teratogenic effects of finasteride on a male fetus, if given to pregnant woman.
- There is a small risk of **transient impotence** as an adverse effect, which is fully reversible upon treatment cessation.

3. **Dithranol:** The nature of the dithranol effect in alopecia areata is not well understood but it may be immunomodulatory. The treatment is generally used in children or for patients experiencing severe disease. The application protocol involves rubbing dithranol cream, at a 0.5 or 1% concentration, for a short (20 to 60 minute) time interval to the affected scalp. Upon termination of the contact period, the medication is washed off the scalp with a shampoo. At least 6 months are required before a cosmetically acceptable response is obtained. Adverse effects can include
   - pruritus,
   - erythema
   - scaling
   - folliculitis

   However, such irritation can be minimised by applying smaller amounts of medication and/or by employing shorter contact periods. It is also necessary to protect the skin against sun exposure and to ensure that dithranol does not get into the eyes.[7]

4. **Diphencyprone:** Diphencyprone (diphenylcyclopropanone; DPCP) is a contact sensitiser which has been shown to be effective in the treatment of severe alopecia areata affecting more than 50% of the scalp. The agent may suppress hair shedding by the process of antigen competition. The effectiveness of diphencyprone therapy, although unpredictable on an individual basis, is dependent upon the initial extent of the alopecia. The main adverse effects of diphencyprone are severe eczema and disseminated contact eczema.[7]

5. **Corticosteroids:** Corticosteroids can promote regrowth in alopecia areata by exerting an immunosuppressive effect. Hydrocortisone acetate (25 mg mL) and triamcinolone acetonide(5-10 mg mL) betamethasone dipropionate 0.05% and fluocinolone acetonide 0.2%) are commonly used. Corticosteroid is injected just beneath the dermis in the upper subcutis. A 0.05-0.1 mL injection will produce a tuft of hair growth about 0.5 cm in diameter. Multiple intradermal injections of 0.1ml per site, about 1cm apart can be given, the main limitation being patient discomfort. Anaesthetic cream, applied topically about 1 hour before treatment, decreases the subsequent discomfort of the injections. The protocol is repeated approximately once a month. Any hair regrowth is seen within 3 months but the therapy should be stopped if there is no cosmetic response by 6 months, as such individuals may lack adequate corticosteroid receptors in their scalp tissue. A disadvantage of intralesional triamcinolone is that it may induce slight transient atrophy and occasionally follicular atrophy.

   Oral prednisolone treatment can be appropriate for rapidly progressing or extensive alopecia areata affecting more than 50% of the scalp. The mode of action seems to be immunomodulatory but prednisolone may also directly stimulate the hair follicles. The initial daily dose varies between 40 to 60mg, to be reduced by 5mg per week. Potential adverse effects including acne, hypertension, cataracts, diabetes mellitus and bodyweight gain. For many patients, continuous administration of systemic prednisolone is inappropriate because the dose required maintaining hair growth is usually high and the associated toxicity is unacceptable.[7]

6. **Photochemotherapy:** There are several uncontrolled studies of psoralen plus UVA (PUVA) treatment for alopecia areata, using all types of PUVA (oral or topical psoralen, local or whole body UVA irradiation), claiming success rates of up to 60-65%. This modality appears to act *via* an immunomodulatory mechanism and was suggested to alter T lymphocyte function and perhaps suppress local

immunological attack against the hair follicle by depleting Langerhans cells. Photochemotherapy is typically applied 2 to 3 times per week. Any regrowth is usually detected after 20 to 40 sessions with the maximal effect developing within 1 year. However, the results of PUVA therapy have been less than promising. One study in 70 patients documented that while up to 50% of patients experienced remission with PUVA, rapid hair loss occurred in most when PUVA was stopped such that fewer than 15% of patients experienced a lasting remission. Apart from its mediocre effectiveness, PUVA can induce nausea, possible burning of the scalp, pigmentary alterations, photoaging and squamous cell carcinoma. Consequently, dermatologists no longer prefer this treatment.[7]

Table I: The established therapies for alopecia

S. No.	Drug treatment	Proposed Mechanism	Typical application
1.	Minoxidil	Multiple mechanisms	Patchy/moderate disease
2.	Oral finasteride	Inhibits type II 5α-reductase	Patchy/moderate disease
3.	Dithranol (anthralin)	Immunomodulatory	Extensive disease
4.	Diphencyprone (DPCP)	Antigen competition	Extensive disease
5.	Oral prednisolone	Multiple mechanisms	Extensive disease
6.	Photochemotherapy	Immunomodulatory	Patchy disease

- **Herbal Therapies**

Natural products in the form of herbal formulations are available on the market and are used as hair tonic, hair growth promoter, hair conditioner, hair-cleansing agent, antidandruff agents, as well as for the treatment of alopecia and lice infection. A number of herbal products have been acclaimed with hair growth- promoting activity. The traditional system of medicine in India acclaims a number of herbal drugs for hair growth promotion.[9] The article present some of the plants used:

1. **Amla:**

Common Name: Indian Gooseberry
Hindi Name: Amla
Sanskrit Name: Amalaki, Dhatri
Latin Name: *Emblica officinalis* Gaertn.
Part Used: Fresh fruit, Dried fruit, Seeds, Leaves, Root, Bark and Flowers. Fruits are generally used fresh, dry fruits are also used.[10]
Chemical constituents: Amla is highly nutritious and is an important dietary source of Vitamin C, minerals and amino acids. The edible fruit tissue contains protein concentration 3-fold and ascorbic acid concentration 160-fold compared to that of the apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apples. Glutamic acid, proline, aspartic acid, alanine, and lysine are 29.6%, 14.6%, 8.1%, 5.4% and 5.3% respectively of the total amino acids. The pulpy portion of fruit, dried and freed from the nuts contains: gallic acid 1.32%, tannin, gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12% and moisture 3.83%. Amla fruit ash contains chromium, 2.5 ppm; zinc 4 ppm; and copper, 3 ppm.

Effect on hairs: Amla extract's internal use as well as its local application on scalp gives good results in hair loss. It stimulates hair follicles thus promoting hair growth and also improves texture of the hair. It also prevents premature graying of hairs and dandruff. It acts as anti pyretic agent. This not only brings forth a rich, natural shine and soft texture to the hair, but also helps rejuvenate hairs that are dull and damaged.[11]

2. **Babchi:**

Common name: Babchi,Psoralea seeds
Hindi name: Babachi, Babchi, Bavanchiyan, Bhavaj, Bakuci, Bemchi
Sanskrit name: Avalguja, Bakuchi, Chanderlekha
Latin name: *Psoralea corylifolia*
Parts used: Dry fruit seed, Roots, leaves.[9]
Chemical constituents: Preliminary phytochemical screening of babchi oil showed that the essential oil contain most of the phytochemicals including tannins, glycosides, saponins, flavonoids, steroids, terpenoids and flavonosides. However, anthraquinone, phlobatanins and reducing sugars were not

observed in babchi oil. Similar results were reported where phytochemical screening of *Psoralea corylifolia* seeds reveals that the major constituents present were coumarins and flavonoids, and other constituents were steroids and triterpenoids. Phenolic compounds like tannins are potent inhibitors of many hydrolytic enzymes used by plant pathogens. The presence of saponins, tannins, flavonoids, glycosides, carbohydrates, tannins and phenolic compounds, gums and mucilages, fixed oils and fats in *Psoralea corylifolia* leaf extracts had also been reported.[12]

Effect on hairs: It has shown to improve the color of skin, hair, and nails. Seed extract is a good hair tonic and hence used in alopecia areata and hair loss.

3. **Bhringraj:**
Common name: False Daisy[13]
Hindi name: babri, bhamgra, bhangra, bhangraiya, mochkand**,** kehraj
Sanskrit name: Bhringaraj[13]
Latin name: *Eclipta alba*
Parts used: Herb, roots, leaves
Chemical constituents: The extract obtained from Bhringaraj plant contains an alkaloid called ecliptine. This extract is resinous in nature. The leaves of the plant contain a rich amount of protein. The chief constituents of Bhringaraj are coumestan derivatives like wedololactone[1.6%], demethylwedelolactone, desmethyl-wedelolactone-7glucoside and other constituents are ecliptal, ß-amyrin, luteolin-7-O-glucoside, hentriacontanol, heptacosanol, stigmasterol.

Effect on hairs: It is reported to improve hair growth and color. The leaf extract is considered a powerful rejuvenative and especially good for the hair. A black dye obtained from *Eclipta alba* is used for dyeing hair. It also has traditional external uses, such as dermatitis, and on the scalp to address hair loss. A study in rats showed that petroleum ether extracts of *Eclipta alba* decreased the amount of time it took for hair to begin regrowing and to fully regrow in shaved albino rats. The result of treatment with *Eclipta alba* were better than the positive control, 2% minoxidil.[14]

4. **Malkangani:**
Common name: Staff tree;
Hindi name: Malkangani
Sanskrit name: Jyotishmati
Latin name: *Celastrus paniculatus*
Parts used: Fruits and seeds
Chemical constituents: Chemical examination of fixed oil from the CP seed showed presence of fatty acids, *viz*., oleic, linoleic, linolenic, palmitic, stearic, crude lignoceric acid, benzoic and acetic acid as volatile acids. The aqueous extract of CP seed contained traces of tannins, reducing sugars but no starch.The petroleum ether extract of husk from the seeds on saponification yielded palmitic and stearic acids. An unidentified sterol was obtained from unsaponifiable fraction. Several sesquiterpene polyalcohols were reported to be present in the saponified 80% methanolic extract of seed oil and malkanguniol is one of the major constituent. Further, four related alcohols *viz*., polyalcohol A, polyalcohol B, polyalcohol C, polyalcohol D were isolated from the extract along with malkanguniol. Paraffinic hydrocarbons, β-sitosterol, β-amyrin and a pentacyclic triterpene diol paniculatadiol were isolated from the non-sapanifiable fraction of the CP seed oil.[15]

Effect on hairs: Jyotismati is applied on scalp against dandruff and graying of hairs. The proposed mechanism of the drug is by increasing the blood circulation to hair follicles which enhances the hair growth.

5. **Tulsi**:
Common name: Holy Basil
Hindi name: Tulsi
Sanskrit name: Tulsi, Tulasi,
Latin name: *Ocimum gratissimum*
Parts used: Leaf, whole plant
Chemical constituents: Tulsi leaves contain bright, yellow coloured & pleasant odour of volatile oil (0.1 to 0.9%). The oil content of the drug varies depending upon the type, the place of cultivation & season of its collection. The oil is collected by steam distillation method from the leaves. It contains - Eugenol (70%) Carvacrol (3%), Eugenol methyl ether (20%) Caryophyllin, linalool, Aneole, Chavicol, nerol, terpinin 4 - 01, decylaldehyde, r-selinene, α & β - pinenes, champhor sesequiterpenes. The plant is used as a pot herb; leaves are used as condiment in salads

and other foods. It is also reputed to have medicinal properties. Besides the volatile oil, the plant is reported to contain alkaloids, glycosides, saponins and tannins. The leaves contain ascorbic acid carotene, appreciable amount of Vitamin C, traces of maleic acid, citric and tartaric acid[16]

Effect on hairs: Tulsi is used as the effective measure for hair loss and it is considered as one of the essential ingredients of herbal hair loss treatment. It is extensively used for protecting hair from falling and early graying. Tulsi seed in combination with castor oil is a useful remedy for hair lice. It also helps making the hair root stronger, thus reducing hair.[17]

CONCLUSION

Alopecia is a dermatological disorder that has been recognized for more than 2000 years. It is common problem that has affected men and women. It is investigated though many treatments are offered including natural or synthetic based products, but natural product are continuously gaining popularity and the use of plant extract in formulation. Because synthetics based product may cause human health hazard with several side effects. Exploring the herbal drugs for the promotion of hair growth is the vital need of this era. The potential of end number of herbal drugs in hair growth promotion has been studied. But still more scientific documentation of herbal/ayurvedic drugs is needed for the same. This can be attained by careful and accurate characterization of the active phytoconstituents, elucidation of molecular mechanism of their actions, demonstrations of the real efficacy by in vivo studies on proper animal models of hair loss and finally by demonstration of their safety and effectiveness in clinical trials.

REFERENCES

1. Thorat RM., Herbal treatment for hair loss, International Journal of Pharmacy & Technology 2010; 2:4: 497- 503.
2. Patil SM, Sapkale GN., Herbal medicines as an effective therapy in hair loss, Research Journal of Pharmaceutical, Biological and Chemical Sciences 2010;1: 2: 773
3. http://en.wikipedia.org/wiki/Alopecia
4. Alopecia Causes and Reversing Hair Loss. http://www.lifesources.com/pdf/lsi_alopecia.pdf
5. Dhurat R. and Saraogi P., Hair Evaluation Methods: Merits and Demerits, International Journal of Trichology., 2009;1:2:108–119.
6. Ulrike Blume- Peytavi: Hair growth assessment techniques. Springer Berlin Heidelberg Publication, Berlin, chapter 8, 2008:125-157.
7. Victor M. Meidan and Elka Touitou. 2001, Treatments for Androgenetic Alopecia and Alopecia Areata: Current Options and Future Prospects. Drugs; 61;1: 53-69.U
8. http://www.emedexpert.com/classes/hair-loss-medications.shtml
9. Khushboo PS., Jadhav VM., Kadam VJ., and Sathe NS, Psoralea corylifolia Linn.—"Kushtanashini"PharmacognRev.2010;4:7:69–76.http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249905/
10. Sampath KPK., Bhowmik D., Recent Trends in Potential Traditional Indian Herbs Emblica Officinalis and Its Medicinal Importance. Journal of Pharmacognosy and Phytochemistry,2012;1:1:464-469
11. Srivasuki K.P, Nutritional and health care benefits of amla. Journal of Pharmacognosy,2012;3:2:147-151
12. Purkayastha S., Dahiya P., Phytochemical Analysis and Antibacterial Efficacy of Babchi Oil (Psoralea corylifolia) Against Multi-drug Resistant Clinical Isolates PCBEE vol.3 1(2012) IACSIT Press, Singapoore
13. http://en.wikipedia.org/wiki/Eclipta_alba.
14. Danielle Mcloughlin, Hair loss restorstion http://ezinearticles.com/?Can-Bhringraj-Really-Promote-Hair-Growth-Like-Minoxidil&id=6832228
15. Bhanumathy M., Chandrasekar SB., Phyto-pharmacology of Celastrus paniculatus: An Overview. International Journal of Pharmaceutical Sciences and Drug Research 2010; 2:3: 176-181
16. Joshi VR., Mehta CS., Pharmacognostic and scientific evaluation of the plant- Tulsi (Ocimum sanctum). International Journal of Green and Herbal Chemistry,2012;1:1:75-90.
17. Jadhav VM, Thorat RM., Kesharaja Hair Vitalizing Herbs, International Journal of PharmTech Research 2009;1:3:454-467.