

# A Review: Different Types of Plants and its Extract Use in Hair Loss and Hair Growth Therapy

S M Osama Khan

**Abstract:** Hairs are often defined as -"improved epithelial structure formed as a result of keratinization of germinative cells," hairs are the outgrowths from the follicles existing on the skin. Hair consists of keratin with chemical constituents such as Carbon(C), Nitrogen (N), Sulfur(S), & Oxygen (O). Hair growth varies from person to person but on the average hair grows about 15-30 mm/ month. The most unbiased of present study is to treat Alopecia. Alopecia areata is hit or miss hair loss - condition. Herbal drug used internally also as externally used hair growth to prevent premature grayish or hair loss. The claim of higher growth of hair and diminution in loss of hair. Alopecia is one among the major problems amongst urban people to subjection to stress environmental problems etc. So, with the assistance of this review article, we conclude that a lot of herbal drugs having potency for curing alopecia with no side effects. The varied types of allopathic drugs to treat hair loss but they have many side effects. Herbs are starting material for any medicine research. Approximately about 80% residents recommended herbal drugs for his or her beneficial effects along with fewer side effects as compared synthetic drugs.

**Keywords:** Hairs, Ginkgo biloba, Phyllanthus embelica, Allium cepa L, Rosmarinus officinalis & Lavandula, Croton tiglium, Phyllanthus niruri, Zingiber Officinalis, Cinnamomum Verum.

## 1. Introduction<sup>1</sup>

Hairs are often defined as -"improved epithelial structure formed as a result of keratinization of germinative cells," hairs are the outgrowths from the follicles present on the skin. Hair consists of keratin with chemical constituents such as Carbon (C), Nitrogen (N), Sulfur(S), & Oxygen (O). Hair growth varies from person to person but on the average hair grows about 15-30 mm/ month. Hair is that the one of the vital parts of the body derived from ectoderm of the skin, and is protective appendages on the body.

Hairs are two types:

- Vellus Hair;** They are fine, light colored and straight.
- Terminal Hair;** They are thicker dark and should be curly and on the region of eyelashes and eyebrows. 70-100 hairs loss each day is very common however, dropping over 100 hairs each day lasting longer than a couple of week indicates a serious problem.

Alopecia, a dermatological disorder that has been recognized for quite 2000 years is a common problem in cosmetic as well as primary health care practices. It is a common throughout the world and has been estimated to affect between 0.2% and a couple of of the world population. Various synthetic medicines are available for hair loss which doesn't treat permanently and also shows severe side effects. These problems might be solved by the utilization of herbal medicines.

Ayurveda has described hair diseases in three words.

- Indralupta** means alopecia, alopecia total is and alopecia Universalis
- Khalitya** means loss of hair.
- Palitya** means premature hair graying.

## 2. Types of Hair Loss<sup>2</sup>

- Temporary alopecia** - Patient with Alopecia areata in advanced phase and some of them converts into Alopecia totalis/Alopecia universalis.

- Ophiasis alopecia** - Ophiasis type of alopecia areata shows a band like hair loss. It occurs generally within the progressive or the occipital areas of the scalp, and thus it is more difficult to treat, as most medicines have a delayed action on these areas.
- Traction Alopecia** - Hair elegance that bind hairs so tight can causes much traction at the basis of hairs, and may develop adhesion alopecia
- Alopecia Areata** (prime stage) - alopecia is a common autoimmune disease that results in the loss of hair on the scalp and elsewhere. It always starts with one or more small, round, non-scarring smooth patches. Mild Brief Alopecia Areata- Patient with repeated but never converts into alopecia totalis or universalis.
- Alopecia Totalis** - Loss of hair from whole Scalp.
- Alopecia Universalis** - Loss of hair from entire body including eyebrows and eyelashes Scar ring Alopecia Any inflammatory process (burns, bacterial infections, ringworm, injury) necessary to cause permanent loss of follicles, affected area referred to as Scarring alopecia. Trichotillomania -This sort of hair loss is known as compulsive pulling or dull self- pulling by a patient Himself or herself.
- Diffuse Alopecia** - Unnecessary Loss of hair everywhere the scalp without creating reinforcement. Hair loss can be occurred due to side effect of the beauty treatments-Any beauty treatments like hair colors, dye, straightening, softening, rebounding, perming etc., which contains harsh chemicals can trigger hair loss for a few individuals. Telogen effluvium (TE) and chronic telogen effluvium-(CTE) Dietary lacks, Crash dieting High grade fever, Anemia, Blood loss, Hormonal imbalance and pregnancy etc. can cause telogen effluvium sort of hair loss telogen word is known for latent phase of the hair and fluvium means.
- Chemotherapy and hair loss** - Chemotherapy is exclusive behavior for cancer patients but it marks normal cells and hair follicles too. This causes hair loss and referred to as anagen effluvium type of alopecia.

Volume 12 Issue 12, December 2023

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

### 3. Hair Growth Cycle and its Mechanism<sup>3</sup>

The hair growth undergoes a tiresome cycle where the anagen phase followed by the catagen and therefore the telogen phase. Within the anagen phase, the hair is actively growing while within the catagen phase it is characterized by the degeneration and resorption of the lower region of the hair follicle. The resting phase, where the hair is inactive, is named telogen phase after this phase the growth of the hair follicle resumes in the scalp, a hair growth cycle has three main phases: Anagen, catagen, and telogen. The anagen phase is that the growth cycle typically lasts 3-5 years. On a healthy scalp, there are approximately 1,000,000 hair and 90% of the follicles are continually within the anagen phase of hair growth.

The catagen stage follows the top of the growth period when a follicle begins to become dormant. The telogen stage may be a dormant or resting period that lasts 3-4 months. When the dormant phase ends, an old hair falls out. A follicle then returns to the anagen stage, and a replacement hair begins to grow. A mean rate of hair growth is near about half an inch per month depending on hair follicles and age of an individual. On the average, 50-60 scalp hairs are lost daily during a normal hair growth cycle and new hairs begin to grow from these follicles. Hair loss begins when less new hair begins the re-growth stage.

### 4. Symptoms of Hair Loss<sup>3,4,5</sup>

There are several factors for the hair loss; a number of the main factors are given below –

- Acute illness
- Autoimmune disorders
- Chemicals (hair dyes)
- Chemotherapeutic agents or drugs
- Diabetes
- Hair loss following childbirth
- Hair styling products
- Hair styling techniques
- High iron deficiency
- Nutritional deficiencies
- Other fungal infections
- Physical trauma to the scalp
- Poisons
- Poor blood circulation
- Poor diet or malnutrition
- Prescription drugs
- Psychological
- Radiation exposure
- Ringworm
- Skin disease
- Stress
- Sudden weight loss
- Surgery
- Thyroid disease

### 5. The Herbs Utilized in the Treatment of Alopecia Provide One of the Following<sup>6,7,8,9,10</sup>

- a) **Nutritional support:** Minerals like calcium, copper, chromium, iodine, zinc, and magnesium are necessary to take care of healthy hair growth. Lack 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 color. An excessive amount of iron is toxic to your body. Make certain to talk to your doctor before taking any mineral supplement. B vitamins (especially B6, B3, B5 and folic acid), biotin (anti-oxidant, sources of biotin is: whole grains, egg yolks, liver, rice and milk. vitamin A is important for over-all good health. It's also beneficial to hair follicles, because it keeps the hair root lubricated. Vitamin E acts as an antioxidant that aids real circulation in the scalp due to increased oxygen uptake in blood, therefore it plays a crucial role in promoting hair growth and preventing hair loss. Coenzyme Q10 (CQ-10) is an important vitamin that provides our body with the nutrient needed to grow healthy hair. They also promote overall vitality, and contribute to beautiful skin and powerful nails. Yogurt and soy, dark green vegetable, whole grain products, essential carboxylic acid, nuts and seedier fatty foods which are typically the simplest sources of vitamin E, an immune enhancing antioxidant and nerve protector. Carrots contain high amounts of vitamin A. it's an antioxidant that helps produce healthy sebum in the scalp. Having an excessive amount of vitamin A can lead to hair loss. There are many other foods that help promote hair growth and stop hair loss, like fruits, egg, spinach, and broccoli.
- b) **DHT blockers and 5- $\alpha$ -Reductase blockers:** After knowing the well-established role of DHT in hair loss, it's recommended that the use of herbs that have pronounced DHT or 5- $\alpha$ -Reductase blocking activity can be used for the treatment of Alopecia (especially Androgenetic). There are some herbs that have proved DHT blocking activity like *Pygeum africanum*, *Senecio repens*, stinging nettle and others with potential 5- $\alpha$ -Reductase inhibiting ability like *Camellia sinensis*, ginseng etc (table 1.). The proposed mechanism of action of DHT blockers and 5- $\alpha$ -Reductase blockers
- c) **Aromatherapy and improved scalp blood Circulation:** Aromatherapy are often used as a supplement to treat alopecia. It uses highly concentrated extracts which are derived from the flowers, leaves, bark and therefore the roots of various plants like *Arnica montana*, *Atlas cedar*, *Lavandula agustifolia*, *Oscimum sanctum*, *Pilocarpus jaborondi*, *rosemary*, *Thyme vulgaris* etc., (table 2). In aromatherapy, the essential oils enter the body through the olfactory system (inhalation) and/or through your skin. like herbs that are taken orally, the essential oils reach the cardiovascular system (the blood) where they bind to receptors and change the chemical composition. These oils work not only on a cellular level to strengthen/calm the systema nervosum, but also on a spiritual one, providing with a way of wellbeing. Topical phytotherapy stimulates hair follicles and it is proved as

safest way to cope up with different type of hair loss (alopecia), however perfect pharmacological actions of those herbs and oils are yet not known.

## 6. Plants Use in Hair Growth and Hair Loss

### a) CROTON TIGLIUM (JAMALGOTA)<sup>11</sup> Basic Information

Scientific Name	Croton Tiglium
Plant Family	EUPHORBIACEAE
Hindi Name	Jamal gota (Jamalgota)
English Name	Purging Croton

## 7. Medicinal Parts

Seeds, Leaves, Roots, External bark of croton roots, Seed oil (croton oil, also called Crotonis oleum)

### a) Phytochemistry (Chemical Composition):

Jamalgota (Croton Tiglium) kernels contain approximately 50 to 60% croton oil. Croton seed oil contains about 17 fatty acids.

#### Main Components:

LINOLEIC ACID, OLEIC ACID, EICOSENOIC ACID

These three fatty acids are found in abundant amount (about 77.33% total) in crotonoil.

#### Mechanism of Action:

It produces irritancy in the skin which results in to the growth of the new hair follicles as it is very dangerous in high quantity.

### b) Celastrus Paniculatus (Malkangni)<sup>12</sup>

Celastrus Paniculatus is botanical name of Indian herb known as Jyotishmati and Malkangani. It belongs with bitter-sweet family named Celastraceae.

#### Common Names

Botanical Name: Celastrus Paniculatus

English Name: Tree, Black-Oil Plant, Climbing Staff Tree  
Hindi Name: Kondgaidh, Malkangni, Malkangani, Sankhu  
Sanskrit Name: Jyotishmati, Jyotishka, Katabhi, Kanguni

#### Medicinal Parts

Celastrus Paniculatus Seeds and its oil are mainly used in ayurvedic medicines. Leaves are also used for de-addiction. Generally, leaf juice is beneficial for treating opium addiction.

#### Phytochemistry (Chemical Composition):

Celastrus Paniculatus Seeds contains around 30% oil content in which following alkaloids are present. Celapagin, Celapanigin, Celapanin, Celastrine and Paniculatine

#### Mechanism of Action:

It relaxed the muscle and muscular pain.

### c) Cinnamon (Dalchini)<sup>13</sup> Botanical Source:

Cinnamon consists of the dried inner bark of the shoots of coppiced trees of Cinnamomum zeylanicum Nees, Family

Lauraceae.

#### Phytochemistry (Chemical Composition):

Cinnamon contains 0.5 to 6.0 percent of volatile oil, the chief constituent of which is cinnamic aldehyde (60-70%) and eugenol (4%). Cinnamon also contains tannin and mucilage.

#### Mechanism of action:

It will increase the blood circulation near the roots of hair.

### d) Phyllanthus embelica (Euphorbeaceae)<sup>14</sup>

#### Phytochemistry (Chemical Composition):

Vitamin C, phyllembin, tannin, phosphorous, iron, calcium.

#### Mode of Application:

Indian gooseberry oil, prepared by boiling dry pieces of Indian gooseberry in copra oil, is taken into account a valuable hair tonic for enriching hair growth. A mix of an equal quantity of fresh Indian gooseberry juice and lime juice, used as a shampoo also stimulates hair growth and prevents hair loss.

#### Mechanism of Action:

Iron is involved within the oxygenation of your body's red blood cells. It's essential for normal hair growth and maintaining healthy hair. If the quantity of iron cannot be replaced with food intake, iron deficiency will cause hair loss due to oxygen deficiency.

### e) Rosmarinus officinalis (Labiatae) and Lavandula<sup>15</sup>

#### Phytochemistry (Chemical Composition):

Angustifolia Miller (Labiatae) Rosmary constitutes 1-2% essential oil containing 0.8-6% of esters and 8-20% of alcohols, The principal constituents are 1, 8- cineole, borneol, camphor, bornyl acetate and monoterpene hydrocarbons. The chief constituents of lavender oil are Lavenanol, linalyl acetate, linalol, lavendulyl acetate, terpineol and cineol.

#### Mode of Application:

These oils were massaged into the scalp for a minimum of two minutes daily for seven months.

#### Mechanism of Action:

The essential oils enter your system through the olfactory system (inhalation) and/or through your skin and reach your cardiovascular system (the blood) where they bind to receptors and change the chemical composition. Topical phytotherapy stimulates hair follicles and it is proved as safest way to cope up with different type of hair loss (alopecia), however perfect pharmacological actions of those herbs and oils are yet not known

### f) English walnut (Juglandaceae)<sup>16</sup>

#### Phytochemistry (Chemical Composition):

Fatty acids, linolic acid (50.58 - 66.60%) are the predominant carboxylic acid followed by oleic acid (14.88 - 28.71%) and omega-6 fatty acid (9.16 - 16.42%). The opposite fatty acids were found in trace contents. The macronutrient contents of walnut are 100 g-1 for K (911.0 - 684.3), P (434.7 - 356.2), Ca (756.7 - 388.2), Mg (444.0 -

330.8) and Na (48.9 - 26.1) while micronutrient contents of walnut are Fe (6.6 - 4.3), Cu (2.8 - 1.8), Mn (5.7 - 2.7) and Zn (4.3 - 2.7). The potassium contents were found to be above those of the other minerals in all kernels of the walnuts.

#### Mode of Application:

The appliance of walnut oil all over the scalp and massaging it into the hair roots is also beneficial in the treatment of hair loss. It nourishes the hair and promotes hair growth.

#### Mechanism of Action:

The fruit contains essential minerals which are helpful within the growth of healthy hair. Iron increases blood circulation and oxygen supply as stated earlier. Zinc helps to secrete the scalp with much needed oil and avoid dandruff which will cause hair loss. Just in case of Copper, study shows that these tripeptide complexes may very well be able to regrow hair, even in patients with total hair loss thanks to alopecia. Healthy tissue concentrations of copper lies between 1.7 and 3.5 milligrams

#### g) Ginkgo (Ginkgoaceae)<sup>17</sup>

##### Phytochemistry (Chemical Composition):

Ginkgolides A, B, C, J, M, bioflavin, sitosterol, lactones and anthocyanins. Mode of Application:

The drug is extracted in copra oil and is massaged for at least 2 minutes.

#### Mechanism of Action:

The drug is understood to improve cerebral microcirculation and hence increase oxygen supply.

#### h) Onion L. (Liliaceae)<sup>18</sup>

##### Phytochemistry (Chemical Composition):

Protein (albumin), allyl propyl disulphide, diallyl sulphide, alliin, allicin. It also contains some mineral like potassium, zinc, calcium, magnesium and traces of chromium. 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 its red. It should be rubbed with honey afterwards.

#### Mechanism of Action:

Zinc helps to secrete the scalp with much needed oil and avoid dandruff which will cause hair loss. Iron is involved within the oxygenation of your body's red blood cells. It's essential for normal hair growth and maintaining healthy hair

#### i) Glycyrrhiza glabra Linn. (Leguminosae)<sup>19</sup>

##### Phytochemistry (Chemical Composition):

The chief constituents are glycyrrhizin, potassium and calcium salt of glycyrrhizic acid.

#### Mode of Application:

The paste of liquorice, made by grinding the pieces in milk with a pinch of saffron, is another valuable remedy for patchy baldness. This paste should be applied over the bald

patches in the dark before going to bed.

#### Mechanism of Action:

The extract of liquorice has proved to possess

#### j) Phyllanthus embelica (Euphorbeaceae)<sup>20</sup>

##### Phytochemistry (Chemical Composition):

Vitamin C, phyllembin, tannin, phosphorous, iron, calcium.

#### Mode of Application:

Indian gooseberry oil, prepared by boiling dry pieces of Indian gooseberry in copra oil, is taken into account a valuable hair tonic for enriching hair growth. A mix of an equal quantity of fresh Indian gooseberry juice and lime juice, used as a shampoo also stimulates hair growth and prevents hair loss.

#### Mechanism of Action:

Iron is involved within the oxygenation of your body's red blood cells. It's essential for normal hair growth and maintaining healthy hair. If the quantity of iron cannot be replaced with food intake, iron deficiency will cause hair loss due to oxygen deficiency.

## 8. Some Research

- 1) Naryan et al. investigated the therapeutic potential of guava and its polyherbal formulation on chemotherapy induced alopecia. The hydroalcoholic extract of guava at the dose of 300mg/kg were tested for its hair growth activity in mice. Alkaline phosphatase level on top of things was 93.66U/L and this level was decreased in toxic group. Guava extract at the dose of 300mg/kg orally and 5% solution topically increased the level of Alkaline phosphatase and hair density in chemotherapy induced alopecia mice.<sup>21</sup>
- 2) Dixit et al. investigated hair growth activity of a mix of Eclipta alba hassak, Citrullus colocynthis shared and Tridax procumbens.<sup>23</sup>
- 3) The methanolic extract of Eclipta alba were screened for its hair growth promoting activity in C57/BL6 mice by Kanika et al. Methanolic extract of Eclipta alba at the dose of three .2 mg/15cm<sup>2</sup> and 1.6mg/15cm<sup>2</sup> was applied in mice and compared with standard drug minoxidil. Both the dose of extract improves the expansion of hair in a dose dependent manner. The share improvement of hair growth at the dose of 3.2 mg/15cm<sup>2</sup> was similar like minoxidil.<sup>24</sup>
- 4) Green tea contains a high amount of purine alkaloids, flavonoids, caffeic acid derivative, essential oil and catechins including epigallocatechin gallate. Epigallocatechin gallate isolated from the leaves of tea and investigated for its effect on human dermal papilla cells in vivo and in vitro. The Epigallocatechin gallate showed significant result by hair growth in vitro by up regulating phosphorylated ERK and Akt and by increasing the BCL-2/Bax ratio.<sup>25</sup>
- 5) Ethanolic extract and petroleum ether extract of Citrullus colocynthis were evaluated for hair growth activity on albino rats by Roy et al. 2% and 5% of ethanolic and petroleum ether extract ointment were applied on the skin of rats. The hair growth initiation

was found on 4th day with 5% and 5th day with 2% petroleum ether extract group while hair growth initiation was found on the 6th with menoxidil treated group. The speed of hair growth initiation was found to be in ethanol extract treated group but it was less as compare to petroleum ether extract.<sup>28</sup>

- 6) Rhodes et al has investigated the Primula obconica leaf for its hair growth activity on human volunteers. The patient was firstly sensitized to Primula obconica by wearing a leaf then in one group given corticosteroids was used and in another group Primula obconica was applied after one month of treatment it had been found the Primula obconica was much more effective than corticosteroids.<sup>29</sup>
- 7) Zizyphus jujube volatile oil from seeds was investigated for its potential role on hair growth by in vivo method. Different concentration of essential oil was applied over the shaved skin of mice for 21 days. After 21 days mice treated with different concentration of essential oil of Zizyphus jujube showed a big result for length of hair, hair thickness and hair follicles.<sup>30</sup>
- 8) Polyherbal ointment of Emblica officinalis, fruit Centella asiatica leaf, burn plant leaf, Ocimum sanctum leaf, Eclipta alba extract were evaluated for hair growth activity. The ointment was applied topically on shaved skin of rats and evaluated for various parameters like hair length, hair density and total serum protein estimation. Polyherbal ointment showed significant result as compare to single hydroalcoholic extract of various extract of various plants.<sup>31</sup>
- 9) Hair formulation of Emblica officinalis Bacopa monnieri, Trigonella foenum-graecum, Murraya Koenigii was investigated for its hair growth activity by Milind et al. various concentrations between 1-10% of oil were prepared by three different techniques and tested for hair growth activity. The result showed a hair growth activity during a dose dependent manner. Excellent results of hair growth were found to be during a formulation which was prepared by cloth pouch<sup>32</sup>
- 10) Eswaran Madhuniya et al The petroleum ether (pet. ether) and ethanol extracts of leaves of *Phyllanthus niruri* (*P. niruri*), rhizomes of *Zingiber officinale* (*Z. officinale*) and *Croton tiglium* Linné (*C. tiglium* Linné) seeds were prepared and loaded in ethosomal formulations to evaluate the hair growth promoting activity along with safety. HPTLC analysis confirmed prepared extracts and formulations contain flavonoids and phenols. The in-vitro evaluation of keratinocytes cell line studies shows that the formulation contains ethosomes combine herbal extract shows high hair follicle density after 21 days of regular use with negligible irritation. Thus better outcome and safety were observed in this in compare to normal extract formulation.<sup>33</sup>
- 11) P H Sur et al the book of Ethnobotany and Medicinal Plants of India and Nepal (Vol. 3) page number 78 the author has maintain juice of Croton tiglium seed is use for the hair growth and hair tonic.<sup>32</sup>
- 12) Mukarjee Saurav et al in this book it is maintain that the seed extract of malkangni was use for muscular pain and joint problem. It is also use for hair growth with the baheda oil as nootropic drug and during hair loss.<sup>33</sup>
- 13) Jadeja et al the seed oil of *C. Paniculatus* is used in

traditional phytotherapy for hair care in Gujarat. The seed oil is applied on hair which makes them silky.<sup>34</sup>

- 14) B. Sedamkar et al Dalchini is a highly beneficial supplement for the skin and hair and offers a wide range of health benefits. It increases the blood circulation.<sup>35</sup>

## 9. Summary and Conclusion

In this modern world Alopecia is increasing day by day. There are several reasons for it is they may be hereditary, stress, disease and other chemotherapy drug. Several allopathy drugs have higher drawback which are like addiction and other metabolic disorder. So for this treatment many plant and their parts are used which have less side effect as compare to allopathy drug. But main drawback of the herbal therapy is that they have very low penetration property and they need more time to give therapeutics effects.

## References

- [1] Coglio G and Bosio A. Alopecia and its treatment- the reality of new chances of success in clinical study of NuHair: first food supplement with great scientific impact, How & Why in Medicine; Dermatology supplement May 2002.
- [2] Muradoglu F, Oguz HI, Yildiz K and Yilmaz H: Some chemical composition of walnut (*Juglans regia* L.) selections from Eastern Turkey. African Journal of Agricultural Research 2010; 5(17): 2379-2385.
- [3] Hay IC, Jamieson M and Ormerod AD: Randomized trial of aromatherapy. Successful treatment for alopecia areata. Archives of dermatology 1999 May; 135(5):602-3.
- [4] Sharquie KE and Al-Obaidi HK: Onion juice (*Allium cepa* L.), a new topical treatment for alopecia areata. The Journal of dermatology 2002 Jun; 29(6):343-6.
- [5] Liao S and Hiipakka RA: Selective inhibition of steroid 5 $\alpha$  reductase isozymes by tea epicatechin-3-gallate and epigallocatechin-3-gallate. Biochemical and Biophysical Research Communication 1995; 25:214; 833-838.
- [6] Prager N, Bickett K, French N and Marcovici G: A randomized, double-blind, placebo-controlled trial to determine the effectiveness of botanically derived inhibitors of 5 $\alpha$ -reductase in the treatment of androgenetic alopecia. Journal of alternative and complementary medicines (New York, N.Y.) 2002 Apr; 8(2):143-52.
- [7] Esfandiari A and Kelley P: The effects of tea polyphenolic compounds on hair loss among rodents. Journal of the National Medical Association 2005 Jun; 97(6):816-8.
- [8] Murata K, Takeshita F, Samukawa K, et al. Effects of Ginseng rhizome and ginsenoside Ro on testosterone 5 $\alpha$ -reductase and hair re-growth in testosterone treated mice. Phytother Res 2011. DOI: 10.1002/ptr.3511.
- [9] Roh SS, Kim CD, Lee MH, et al. The hair growth promoting effect of *Sophora flavescens* extract and its molecular regulation. J Dermatol Sci 2002; 30: 43-9.
- [10] Matsuda H, Yamazaki M, Naruto S, et al. Antiandrogenic and hair growth promoting activities of *Lygodium Spora* (spore of *Lygodium japonicum*) I.

- Active constituents inhibiting testosterone 5reductase. Biol Pharma Bull 2002; 25: 622-6.
- [11] Ali M, Singh V. "Phytoconstituents and hairstimulant formulation from Nordostachys jatamansi", 5th Int cong on Trad Asian Med, Halle (Saale) 2002: 18-24.
- [12] Gottumukkala VR, Annamalai T, TMukhopadhyay T. Phytochemical investigation and hair growth studies on the rhizomes of Nardostachys jatamansi DC.Pharmacog Mag 2011; 26: 146-50.
- [13] Saraf S, Pathak AK, Dixit VK. Hair growth promoting activity of Tridaxprocumbens. Fitoter 1991; 62: 495-8.
- [14] Pandit S, Chauhan NS, Dixit VK. Effect of Cuscuta reflexa Roxb on androgen-induced alopecia. J Cosm Dermatol 2008; 7: 199-204.
- [15] Sharquie KE, Al-Obaidi HK. Onion juice(*Allium cepa* L.), a new topical treatment for alopecia areata. J Dermatol 2002; 29: 343-6.
- [16] Patna P, Varghese D, Balekar N, et al. Formulation and evaluation of herbal hair oil for alopecia management. *Planta indica* 2006; 2: 27-30.
- [17] Roy RK, Thakur M, Dixit VK. Development and evaluation of Polyherbal formulation for hair growth promoting activity. *J Cosm Dermatol* 2007; 6: 10812.
- [18] Libecco JF, Bergfeld WF. Finasteride in the treatment of alopecia. *Exp Opin Pharmacother* 2004; 5: 993-40.
- [19] Price VH, Menefee E, Strauss PC. Changes in hair weight and hair count in men with androgenetic alopecia, after application of 5% and 2% topical minoxidil, placebo or no treatment. *J Amer Acad Dermatol* 1999; 41:717-21.
- [20] Gavatia NP, Tailang M, Gupta BK, et al. Therapeutic potential of *Psidium guajava* and its polyherbal formulation on chemotherapy induced alopecia. *JPharm Res* 2011; 4: 1082-83.
- [21] Park WS, Shin Ho J. Fructus panax ginseng extract promotes hair regeneration in C57BL/6 mice. *J Ethnopharmacol* 2011; 138: 340-44.
- [22] Sakaguchi I, Ishimoto H, Matsuo M, et al. The watersoluble extract of *Illicium anisatum* stimulates mouse vibrissae follicles in organ culture. *Exp Dermatol* 2004; 13: 499-504.
- [23] Osawa Y, Tamaki S, Sawaki S, et al. Promotion of hair-growth with *Laminaria angustata* extracts. *Int J Cosm Sci* 2004; 26: 215.
- [24] Al-Sereiti MR, Abu-Amer KM, Sen P. Pharmacology of rosemary (*Rosmarinus officinalis* Linn.) and its therapeutic potentials. *Indian J Exp Biol* 1999; 37: 124-30.
- [25] Lee GS, Hong EJ, Gwak KS, et al. The essential oils of *Chamaecyparis obtusa* promote hair growth through the induction of vascular endothelial growth factor gene. *Fitoter* 2010; 81: 17-24.
- [26] Kim SC, Kang JI, Kim MK, et al. Promotion effect of norgalanthamine, a component of *Crinum asiaticum*, on hair growth. *Eur J Dermatol* 2010; 20: 42-8.
- [27] Vyas N, Keservani RK, Gavatia NP, Jain S, Argal A. Effect of *Tamarindus indica* and its Polyherbal Formulation on Radiation induced Alopecia. *Int J Pharma Tech Res* 2010; 2: 1543 -46.
- [28] Kawano M, Han J, Kchouk ME, et al. Hair growth regulation by the extract of aromatic plant *Erica multiflora*. *J Nat Med* 2009; 63: 335 -39.
- [29] Gavatia NP, Tailang M, Gupta BK, et al. Therapeutic potential of *Psidium guajava* and its polyherbal formulation on chemotherapy induced alopecia. *JPharm Res* 2011; 4: 1082-83.
- [30] Park WS, Shin Ho J. Fructus panax ginseng extract promotes hair regeneration in C57BL/6 mice. *J Ethnopharmacol* 2011; 138: 340-44.
- [31] Sakaguchi I, Ishimoto H, Matsuo M, et al. The watersoluble extract of *Illicium anisatum* culture. *Exp Dermatol* 2004; 13: 499-504.
- [32] Osawa Y, Tamaki S, Sawaki S, et al. Promotion of hair-growth with *Laminaria angustata* extracts. *Int J Cosm Sci* 2004; 26: 215.
- [33] Eswaran Madhuniya, Gunasekaran Venkatesh, Govindarajan Shyamala, Venkatraman Manjari, Santhanam Ramesh, Arjunan Karuppaiah & Veinramuthu Sankar "Development of ethosome comprising combined herbal extracts and its effect on hair growth" *Advances in Traditional Medicine* (2020) Published: 25 July 2020
- [34] Dr. Aprana Pankaj Thapliyal, Dr. Kalpana Denge "prospective clinical study to assess the safety and efficacy of dravanti beej lepa (local application of croton tiglium) in indralupta w. S. R. To alopecia areata" *International Journal of Research GRANTHALAAY* Vol. 6 No. 7 (2018): Volume 6 Issue 7 - July, 2018
- [35] PR Sur, A M Saran, A C Halder "Selected plant Used as Hair tonic" *Ethnobotany and Medicinal Plants of India and Nepal* (Vol. 3) Page 78
- [36] Mukharjee Saurav, Kulkarni omkar "Oil Extraction from medicinal Plants by pawra tribe of nandurbar distric (Maharastra) Value addition and sustainable utilaization with the aid of ayurved" *Indiaan Journal Of traditional knowledge* vol 12 (2) April 2013 page 274
- [37] B. Sedamkar and D. A. Kolhapure "To buildup the immunity power by using medicinal plants" *Juni Khyat* Vol-10 Issue-6 No. 9 June 2020 page 29