IJPSR (2011), Vol. 2, Issue 7 **(Review Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 14 April, 2011; received in revised form 21 May, 2011; accepted 18 June, 2011

ALOPECIA: HERBAL REMEDIES

R. Kaushik*, D. Gupta and R. Yadav

Ram-Eesh Institute of Vocational and Technical Education, Greater Noida, Uttar Pradesh, India

Keywords:

Alopecia,
Alopecia areata,
Alopecia androgenetic,
minoxidil,
DHT blocker,
Nutritional support,
Aromatherapy

Correspondence to Author:

Rahul Kaushik

Ram-Eesh Institute of Vocational and Technical Education, Plot No.3, Knowledge Park 1, Greater Noida, Uttar Pradesh, India

ABSTRACT

Alopecia is the medical term for hair loss or baldness. It is a health condition in which hair is lost from some or all areas of the body, usually from the scalp. Hair loss can be caused due to different reasons, such as genetic tendencies, environmental triggers, exposure to chemicals, medicines, nutritional deficiency, extreme stress or long illness etc. On the basis of hair loss pattern and causes, alopecia is classified into several categories. The two major forms i.e. *Alopecia areata* and Androgenetic alopecia are of main concern. At present a number of synthetic remedies like Corticosteroids, dithranol, tretinoin, minoxidil, zinc, systematic Cortisone, irritants, immuno-suppressive drugs, finasteride, azelaic acid are available for the treatment of Alopecia (both Androgenetic and Areata), but not a single or multiple drug therapy is giving satisfactory and permanent results to the Alopecia patients. Besides, a number of side effects are associated with the use of these synthetic compounds, including erythema, scaling, pruritis, dermatitis, itching, etc. So to cope with the problem of Hair loss, here we have looked into the Nature's treasure and found a number of herbs with proven records for the treatment of alopecia. Nutritional support, DHT blockers and 5-α-Reductase blockers, Aromatherapy and improved scalp blood circulation are the proposed mechanisms of action for these herbal remedies. Being natural drugs there are many advantages of using them like patient compliance, less side-effects, easy availability, low-cost and more than one mode of action for treatment of Alopecia.

INTRODUCTION: Hair is one of the vital parts of the body derived from ectoderm of skin, is protective appendages on the body and considered accessory structure of the integument along with sebaceous glands, sweat glands and nails. They are known as epidermal derivatives as they originate from the epidermis during embryological development. Hair is an important of the overall appeal of the human body. Alopecia, a dermatological disorder that has been recognized for more than 2000 years is a common problem in cosmetics as well as primary health care practice. It is common throughout the world and has been estimated to affect between 0.2 % and 2% of the world population. A synthetic drug like minoxidil is a potent vasodilator and scientifically proved for the treatment of alopecia. But the use of these synthetic drugs are associated with many adverse events and generally not advisable for safe and effective treatment of alopecia, so the drugs of natural origin are necessary to replace the synthetic one and reduce the adverse effects associated with them. Hence this review article is presented compiling all the updated information on natural herbs exhibiting potent action against alopecia along with the mechanism of actions. Alopecia is the medical term for hair loss or baldness.

There are various causes for Alopecia such as genetic tendencies [1], environmental triggers, exposure to chemicals, medicines, nutritional deficiency, oxidative stress [2] or long illness etc There are various types of alopecia but the two types of major concern are *Alopecia areata* and Androgenetic alopecia [3].

Androgenetic Alopecia [4]:

(Male Pattern Baldness [5]/Female Pattern Baldness [6]): Androgenetic Alopecia can occur in both men and women and is characterized by the loss of hairs in defined pattern. In women Androgenetic Alopecia appears as diffuse hair loss occurring over most of the scalp. In men however the pattern of loss usually starts with a receding hairline which then advances to thin the top of the head.

***Alopecia Areata*:** *Alopecia Areata* is a highly unpredictable, common autoimmune skin disease resulting in the loss of hair on the scalp and elsewhere on the body. It usually starts with one or more small, round, smooth patches on the scalp and can progress to total scalp hair loss (*alopecia totalis*) or complete body hair loss (*alopecia universalis*). *Alopecia universalis* is the rarest form of *Alopecia areata*.

In all forms of *alopecia areata*, the hair follicles remain alive and are ready to resume normal hair production whenever they receive the appropriate signal. In all cases, hair regrowth may occur even without treatment and even after many years.

Besides presence of a number of synthetic remedies like Cortocosteroids, dithranol, tretinoin, minoxidil, zinc, systematic Cortisone, irritants, immuno-suppressive drugs, finasteride [24], azelaic acid for the treatment of Alopecia(both Androgenetic and Areata), no single or multiples drug therapy is giving satisfaction to the Alopecia patients. The side-effects associated with the use of these synthetic compounds includes erythema, scaling, pruritus, dermatitis, itching or skin rash. Sunburn should be avoided while using minoxidil as some dermatologists have suggested minoxidil exacerbates the tissue damage.

Rare events include; acne at site of application, burning of the scalp, increased hair loss, inflammation or soreness at root of hair, reddened skin, swelling of the face, and an intolerance to tobacco. So to cope with the problem of Hair loss, here we have looked into the Nature's treasure and found a number of herbs with proven records for the treatment of alopecia. Being natural drugs there are many advantages of using them like patient compliance, less side-effects and more than one mode of action for treatment of Alopecia.

The herbs used in the treatment of alopecia provide one of the following:

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

Nutritional Support: Minerals such as calcium, iron, copper, chromium, iodine, zinc, and magnesium are necessary to maintain healthy hair growth. 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 color. Too much iron is toxic to your body. Be sure 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 are: whole grains, egg yolks, liver, rice and milk. Vitamin A is important for over-all good health. It's also beneficial to hair follicles, as it keeps the hair root lubricated. Vitamin E acts as an antioxidant that aids effective circulation in the scalp due to increased oxygen uptake in blood, therefore it plays an important role in promoting hair growth and preventing hair loss. Coenzyme Q10 (CQ-10) is an essential vitamin that provides our body with the nutrients needed to grow healthy hair. They also promote overall vitality, and contribute to beautiful skin and strong nails.

Yogurt and soy, dark green vegetable, whole grain products, essential fatty acid, nuts and seed are fatty foods which are typically the best sources of vitamin E, an immune enhancing antioxidant and nerve protector. Carrots contain high amounts of vitamin A. It is an antioxidant that helps produce healthy sebum in the scalp. Having too much vitamin A can lead to

hair loss. There are many other foods that help promote hair growth and prevent hair loss, such as fruits, egg, spinach, and broccoli. The various herbs providing nutritional support are summarized below in **table 1.**

TABLE 1: HERBS PROVIDING NUTRITIONAL SUPPORT IN THE TREATMENT OF ALOPECIA

Biological Source	Family	Common name	Part used	Chem. Const.	Action
Aloe barbadensis	Liliaceae	Aloe vera	Leaves	Minerals	Nutritional support
Amaranthus spinosus L.	Amaranthaceae	Bathua	Seeds, leaves	Fe, Cu, Zn & other Minerals	Nutritional support
Avena sativa	Poaceae	Wild Oats	Seeds	Carbohydrates, Fibers, Fe, Zn and Mn	Nutritional support
Bacopa monniere	Scrophulariaceae	Brahmi	Entire plant	Triterpenoids saponins, bacosides	Nutritional support and nerve stimulant
Cajanus cajan	Fabaceae	Pigeon pea	Seeds	Protein, starch & minerals.	Nutritional support
Daucus carota L.	Apiaceae	Carot	Roots	B-carotene, antioxidants & minerals	Nutritional support
Juglans regia L.	Juglandaceae	Akhrot	Fruit	Fe, Cu, Mn, Zn, K, proteins and fats	Nutritional support
Lactuca sativa L.	Asteraceae	Lettuce	Leaves	Vit. A & folic acid	Nutritional support
Medicago sativa	Fabaceae	Alfalfa	Leaves	Proteins, Calcium, Minerals & Vitamins	Nutritional support
Pelvetia canaliculata	Fucaceae	Channelled wrack	Brown algae	Isoflavones	Antioxidant action like Vit. E
Phyllanthus embelica	Euphorbiaceae	Amla	Fruit	Gallic acid, Vit. C, Quercetin	Nutritional support
Prunus amygdalus	Rosaceae	Badam	Seed oil	Vit B1, B2, B3, minerals, Vit. E, fats	Nervine tonic

DHT blockers and 5-α-Reductase blockers [7, 8, 9, 10]: After knowing the well established role of DHT in hair loss, it is recommended that the use of herbs that have pronounced DHT or 5-α-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, Seneroa repens, Urtica dioica*** and others with potential 5- α-Reductase inhibiting ability like ***Camellia sinensis, Panax ginseng*** etc **(table 1.)**. The proposed mechanism of action of DHT blockers and 5-α-Reductase blockers is given in the **(fig. 1).**

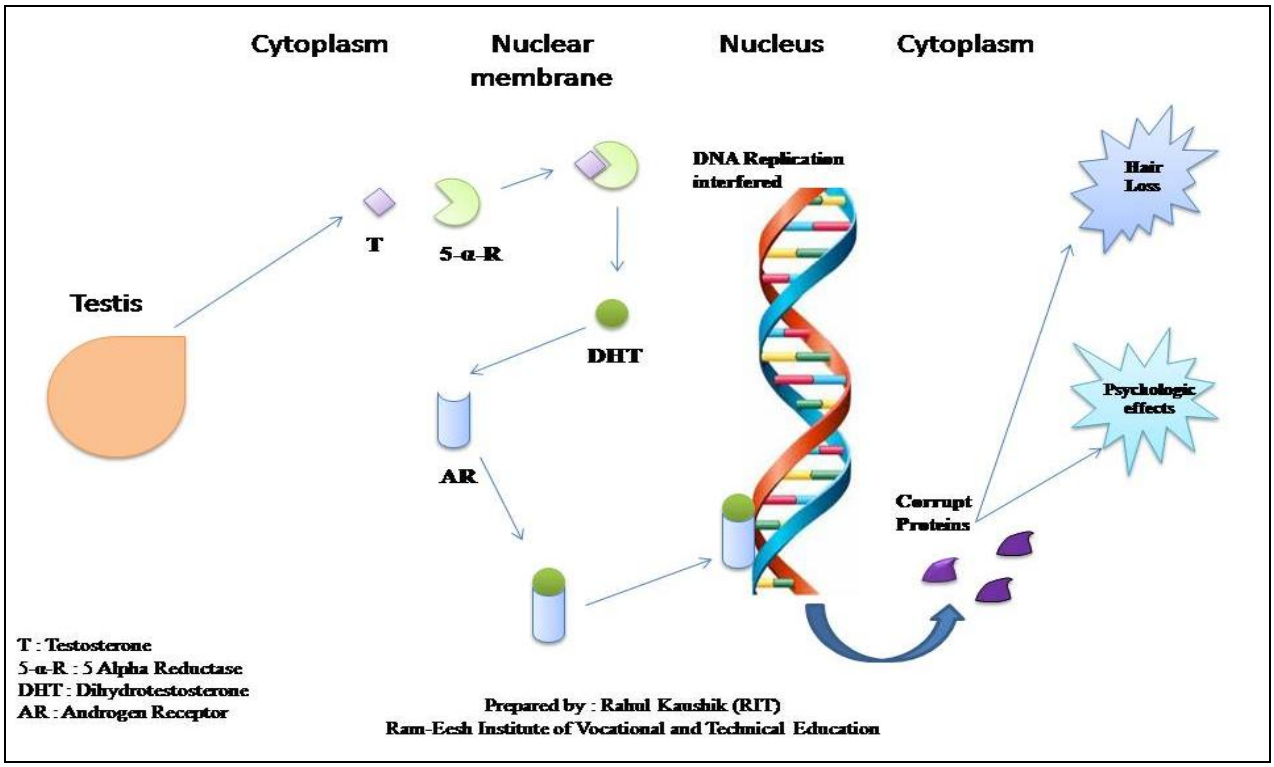

FIG. 1: PROPOSED MECHANISM OF ACTION OF DHT BLOCKERS AND 5-A-REDUCTASE BLOCKERS

Aromatherapy: Aromatherapy 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 atlantica, Lavandula agustifolia, Oscimum sanctum, Pilocarpus jabarondi, Rosmarinus officinalis, Thyme vulgaris etc*., **(table 2).** In aromatherapy, the essential oils enter the body through the olfactory system (inhalation) and/or through your skin. As with herbs that are taken orally, the essential oils reach the circulatory 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 nervous system, but also on a spiritual one, providing with a sense of well being. Topical herbal therapy 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 these herbs and oils are yet not known.

TABLE 2: HERBS FOR ALOPECIA WITH THEIR MODE OF ACTIONS

Biological Source	Family	Common name	Part used	Chem. Const.	Action	Ref.
Arnica Montana	Asteraceae	Mountain tobacco	Flowers	Terpenoids	Aromatherapy	11
Cedrus atlantica	Pinaceae	Cedarwood	Wood chips & saw dust	Terpenoids	Aromatherapy	12
Lavandula agustifolia	Lamiaceae	Lavender	Flowering tops	Terpenoids	Aromatherapy	12
Oscimum sanctum	Lamiaceae	Tulsi	Whole plant	Terpenoids	Aromatherapy	11
Pilocarpus jabarondi	Rutaceae	Jabarondi	Leaves	Terpenoids	Aromatherapy	11
Rosmarinus officinalis	Lamiaceae	Rosemarry	Flowering tops	Terpenoids	Aromatherapy	12
Thyme vulgaris	Lamiaceae	Thyme	Flowering tops & leaves	Terpenoids	Aromatherapy	12
Allium cepa L.	Alliaceae	Onion	Cloves	Allicin, Vit. C S-containing compds., minerals	Stimulates hair regrowth	13
Allium sativum L.	Alliaceae	Garlic	Cloves	Allicin, Vit. C S-containing compds., minerals	Anti-microbial & nerve stimulation	14
Camellia sinensis	Theaceae	Tea	Leaves	Catechins, epicatechins, caffeine, & other tannins	5-α reductase inhibitor	15, 16, 17
Capsicum annum	Solanaceae	Pepper	Fruits	Capsiacin and isoflavones	Nerve stimulation and production of IGF-I	18
Eclipta alba (L.) Hassk	Asteraceae	Bhringraj	Leaves	Ecliptasaponin C, daucosterol, stigmasterol-3-O-glucoside	Follicular enlargement and prolongation of Anagen phase	19, 20
Ginkgo biloba	Ginkgoaceae	Ginkgo	Leaves	Flavonoids glycosides, terpenoids	Increases cerebral microcirculation	21
Hibiscus rosa sinensis Linn.	Malvaceae	Gudhal	Flower	Flavones, cyclopeptide alkaloid, hentriacontane, riboflavin, thiamine	Follicular enlargement and prolongation of Anagen phase	19
Nardostachys jatamansi	Valerianaceae	Jatamansi	Rhizomes	Bornyl acetate, valeranone, jonon, menthylthymyl-ether and 1,8-cineol	Follicular enlargement and prolongation of Anagen phase	19
Panax ginseng	Araliaceae	Ginseng	Roots	Ginsennosides, phytoestrogens &Minerals	5-α reductase inhibitor	16, 22
Pygeum africanum	Rosaceae	Pygeum	Dried bark	Ferulic acid esters (n-docosanol and tetracosanol)	Lowerdown DHT levels	16, 23, 24

Seneroa repens	Arecaceae	Saw Palmetto	Berries	Steroidal saponins, fatty acids, phytosterols, volatile oil, resins and tannins	DHT blocker	23, 24
Urtica dioica	Urticaceae	Stinging nettle	Roots	Vit. K, A & C and minerals	DHT blocker	16, 23, 24
Zanthoxylon rhetsa (Roxb.) DC.	Rutaceae	Indian Ivy Rue, Cape Yellowwood	Seeds	Zanthoxylin, vol. oils	Enhances microcirculation in scalp	25
Polygonum multiflorium	Polygonaceae	Fo-Ti, He Shou Wu	Roots	Glycosides, antioxidants	Nutritional support	26

Few Herbal preparations and method of application for the treatment of Alopecia:

(i) ***Ginkgo biloba*** (Ginkgoaceae)

Chemical constituents: Ginkgolides A, B, C, J, M, bioflavin, sitosterol, lactones and anthrocyanins.

Mode of Application: The drug is extracted in coconut oil and is massaged for at least 2 minutes.

Reason [21]: The drug is known to improves cerebral microcirculation and hence increases oxygen supply.

(ii) ***Phyllanthus embelica*** (Euphorbeaceae)

Constituents: Vitamin C, phyllemblin, tannin, phosphorous, iron, calcium

Mode of Application: Indian gooseberry oil, prepared by boiling dry pieces of Indian gooseberry in coconut oil, is considered a valuable hair tonic for enriching hair growth. A mixture of an equal quantity of fresh Indian gooseberry juice and lime juice, used as a shampoo also stimulates hair growth and prevents hair loss.

Reason: Iron is involved in the oxygenation of your body's red blood cells. It is essential for normal hair growth and maintaining healthy hair. If the amount of iron can not be replaced with food intake, iron deficiency will cause hair loss because of oxygen deficiency.

(iii) ***Allium cepa*** **L.** (Liliaceae)

Constituents: 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 it is red. It should be rubbed with honey afterwards.

Reason [13]: Zinc helps to secrete the scalp with much needed oil and avoid dandruff that may cause hair loss. Iron is involved in the oxygenation of your body's red blood cells. It is essential for normal hair growth and maintaining healthy hair.

(iv) ***Rosmarinus officinalis*** (Labiatae) and ***Lavandula angustifolia Miller*** (Labiatae)

Constituents: Rosmary constitutes 1-2% volatile 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 hydro-carbons.

The chief constituents of lavender oil are Lavenanlol, linalyl acetate, linalol, lavendulyl acetate, terpineol and cineol.

Mode of Application: These oils were massaged into the scalp for a minimum of 2 minutes daily for seven months.

Reason [12]: The essential oils enter your system through the olfactory system (inhalation) and/or through your skin and reach your circulatory system (the blood) where they bind to receptors 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), however perfect pharmacological actions of these herbs and oils are yet not known.

(v) *Juglans regia* L. [27] (Juglandaceae)

Constituents: Fatty acids, linoleic acid (50.58 - 66.60%) are the predominant fatty acid followed by oleic acid (14.88 - 28.71%) and linolenic acid (9.16 -16.42%). The other 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 higher than those of the other minerals in all kernels of the walnuts.

Mode of Application: The application 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.

Reason: The fruit contains essential minerals which are helpful in 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 that may cause hair loss. In case of Copper, study shows that these tripeptide complexes may actually be able to regrow hair, even in patients with total hair loss due to alopecia. Healthy tissue concentrations of copper lies between 1.7 and 3.5 milligrams.

(vi) *Glycyrrhiza glabra* Linn. (Leguminosae):

Constituents: The chief constituents are glycyrrhizin, potassium and calcium salt of glycyrrhizinic 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 at night before going to bed.

Reason: The extract of liquorice has proved to possess constituents which promote growth of hair.

CONCLUSION: The condition of hair has been the centre of attention of human civilization since ancient times. Alopecia is one of the major problems amongst urban people due to subjection to stress, environmental problems, etc. So with the help of this review article, we conclude that there are many herbal drugs having potency for curing alopecia with no sides effect. These herbal extracts having multiple phytoconstituents can treat alopecia either by providing nutritional supplements or by acting as DHT and 5-α-Reductase blockers. There are also few natural treasures having volatile oil active constituents which can be used as aromatherapy for treating alopecia by improving scalp blood circulation.

REFERENCES:

1. Hillmer, A.M. et al.: Genetic Variation in the Human Androgen Receptor Gene Is the Major Determinant of Common Early-Onset Androgenetic Alopecia, Am. J. Hum. Genet. 77 (2001): 140–148.
2. Trueb RM: Oxidative stress in ageing of hair. International Journal of Trichology 2009; 1(1) .
3. Hamilton JB. : Patterned loss of hair in man; types and incidence, Ann N Y Acad Sci. 1951; 53(3) :708-28.
4. Camacho, F.M., *et al*: Psychological features of androgenetic alopecia. J Eur Acad Venerol, (2002), 71: 115-121.
5. Norwood OT: Male pattern baldness: classification and incidence, South Med J. 1975; 68(11):1359-65.
6. Olsen, EA. Female pattern hair loss. J Am Acad Dermatol 2001; 45 (Suppl):S70-80.
7. Griffin JE, Wilson JD: The androgen resistance syndromes: 5-alpha-reductase deficiency, testicular feminization and related syndromes. In: Scriver CR, Beaudet AL, Sly WS, Valle D, editors. The Metabolic Basis of Inherited Disease, 6th ed. New York: McGraw-Hill; 1989:1919-44.
8. Chen W, Zouboulis CC, Orfanos CE. The 5 alpha-reductase system and its inhibitors. Recent development and its perspective in treating androgen-dependent skin disorders. Dermatology. (1996); 193(3):177-84.
9. Marty E Sawaya and Vera H Price: Different Levels of 5-Reductase Type I and II, Aromatase, and Androgen Receptor in Hair Follicles of Women and Men with Androgenetic Alopecia, Journal of Investigative Dermatology (1997) 109 :296–300.
10. Stephan Steckelbroeck et al.: Characterization of the 5-Alpha-Reductase-3-Hydroxysteroid Dehydrogenase Complex in the Human Brain. The Journal of Clinical Endocrinology & Metabolism (2001) 86(3):1324-1331.
11. Henry G. Greenish: A Text Book of Materia Medica, Being an Account of the More Important Crude Drugs of Vegetable and Animal. J. & A. Churchill publishers, Third edition, 1920.
12. Hay IC, Jamieson M and Ormerod AD: Randomized trial of aromatherapy. Successful treatment for alopecia areata. Archieves of dermatology 1999 May; 135(5):602-3.
13. 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.
14. Zohreh Hajheysari, Mojgan Jamshidi, Jafar Akbari and Rezaali Mohammadpour: Combination of topical garlic gel and betamethasone valerate cream in the treatment of localized alopecia areata: A double blind randomized controlled study; Indian J Dermatol Venereol Leprol 2007 Jan-Feb; 73(1), 29-32.

15. Liao S and Hiipakka RA: Selective inhibition of steroid 5α-reductase isozymes by tea epicatechin-3-gallate and epigallocatechin-3-gallate. Biochemical and Biophysical Research Communication 1995; 25:214; 833-838.
16. 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.
17. 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.
18. Naoaki Harada, Kenji Okajima, Masatoku Arai, Hiroki Kurihara and Naomi Nakagata: Administration of capsaicin and isoflavone promotes hair growth by increasing insulin-like growth factor-I production in mice and in humans with alopecia. Growth Hormone & IGF Research 17 (2007) 408–415.
19. Thorat RM, Jadhav VM and Kadam VJ: Development and evaluation of polyherbal formulations for hair growth-promoting activity. International Journal of PharmTech Research Oct-Dec 2009, Vol.1, No.4, 1251-1254.
20. Roy RK, Thakur M and Dixit VK: Hair growth promoting activity of *Eclipta alba* in male albino rats. Archieves of dermatological research 2008 Aug; 300(7):357-64.
21. Zhang J, Fu S, Liu S, Mao T and Xiu R: The therapeutic effect of Ginkgo biloba extracts in SHR rats and its possible mechanisms based on cerebral microvascular flow and vasomotion. Clinical hemorheology and microcirculation 2000; 23(2-4):133-8.
22. Liu WK, Xu SX and Che CT: Anti-proliferative effect of ginseng saponins on human prostate cancer cell line. Life Sciences 2000 Aug 4; 67(11):1297-306.
23. Marks LS, Hess DL, Dorey FJ, Luz Macairan M, Cruz Santos PB and Tyler VE: Tissue effects of saw palmetto and finasteride: use of biopsy cores for *in situ* quantification of prostatic androgens. Urology 2001 May; 57(5):999-1005.
24. Chizick, *et al*.: Natural preparation for treatment of male pattern hair loss. October 26, 1999. United States Patent 5,972,345.
25. Finley Ellingwood, M.D. The American Materia Medica, Therapeutics and Pharmacognosy 1919. Southwest School of Botanical Medicines. Eclectic Medical Publications
26. 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.
27. 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.

****