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REVIEW ARTICLE

An Overview on Indian Herbs in Hair Care Therapy

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ABSTRACT:
Hair is a thread-like structure numerously found in vertebrates. It is also considered as one of the symbols of beauty in humans. In this expeditious world, many problems associated with face (on the skin, eyebrows, lips) nails, hair etc. are seen. The provided information emphasizes on various herbal ingredient that owns numerous benefits for hairs and related hair complications in humans. Among various problems, people are experiencing many hairs related problems such as hair loss, split ends, dandruff, increased sebum production, hair thinning. Thus, people are looking for ways to increase hair conditions, prevention for hair associated problems and advanced care. The synthetic or the chemical products causes side effects and adverse effects when used, thus now people have high approach towards organic natural and herbal formulations that tends to show minimum side effects. Generally, herbal preparations are known for its "no side effects" property. Utilization of herbal components is extending progressively. Herbs acts as a source of medicinal properties, foods and supplements since ages. Several cosmetic products are present for hair care prepared from herbal and other natural origin. In contrast, synthetic products, herbal or organic formulations are good alternate that possess no/minimum side effects. In this review, various medicinal plants that own hair care properties are summarized accompanying their biological sources, active chemical constituents having hair care property and their uses.

KEYWORDS: Hair, Herbal constituents, Hair cosmetics, Organic formulations, Natural origin.

INTRODUCTION:
As hairs are considered to be one of the essential parts that complement the beauty of a person, it is important to take right care of the hairs. Hair can be 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[1]. Hair is made of Keratin with other chemical constituents like Oxygen, Carbon, Nitrogen, Sulphur, etc. Different types of Keratin are found but in vertebrates Alpha-Keratin is usually seen that is responsible for growth of hairs, nails, etc[2].

Scalp is an important area in human hair system. It is composed of soft tissue layers that cover the cranium and area of the head where hair grows. It is incorporated with numerous sebaceous glands and hair follicles[3]. Due to changing environment, excessive heat, dirt and pollution leads to overproduction of sebum in the scalp that further leads to various hair problems such as:

1. Hair loss,
2. Hair thinning,
3. Excessive dandruff,
4. Split ends,
5. Dryness and roughness of hair and
6. Bald patches[4].

Causes of hair loss:

1. Acute illness,
2. Stress,
3. Thyroid dysfunction,
4. Prescription drugs,
5. Prolonged operation/ anaesthesia,
6. High iron deficiency/ anaemia,
7. Hair Styling products and
8. Chemotherapeutic agent[5].

Herbal approach:

Traditionally, many herbs and shrubs were in great use by the people. India is rich in its traditional cultural as well as in numerous medicinal plants but many of them are yet not known to humans yet. Medicinal plants are rich in anti-oxidant, anti-inflammatory, anti-bacterial that are beneficial in treatment of various diseases. Now-a-days, people are approaching towards the natural, herbal and organic formulations which are known for their minimum or no side effect properties. The chemical or synthetic formulations are associated with side effects such as skin allergies, rashes, sensitivity etc. Unlike synthetic products, herbal formulations do not cause major adverse effects and are generally safer than that of synthetic products.

Herbs used in treatment of various hair problems:

1. Neem:

Botanical name for neem is *Azadirachta indica* belongs to the family Meliaceae. It is obtained from the leaves of plant *Azadirachta indica*. It is also known as margosa, arishth. It found abundance in tropical and semitropical regions like India, Bangladesh, Pakistan and Nepal. It consists of active compounds like Nimbin, Azadirachtin, Nimbolide, Nimbidin, Sodium Nimbinate, Gedunin, Salannin and polyphenolic flavonoids (Quercetin and Beta-Sitosterol). Generally, the whole plant possesses medicinal properties but the leaves are beneficial for hair. Leaves are rich in Nimbin, Nimbanene, 6-Desacetylnimbinene, Nimbandiol etc. that can be used in treatment of hair problems. Quercetin and Beta-Sitosterol are polyphenolic flavonoids known to have antifungal and antibacterial activities. Azadirachtin and Nimbolide has concentration dependent antiradical scavenging activity and reductive potential. Neem contains flavonoids and various other ingredients that play an important role in inhibition of cancer development[6].

2. Fenugreek:

Botanical name for fenugreek *Trigonella foenum graecum* belongs to the family Fabaceae. It is obtained from dried seeds of *Trigonella foenum graecum*. It is also known as methi, methika, alholva, chandrika in regional language. It contains micronutrients like Vitamin B complex; seeds of fenugreek contain a wide range of saponins, minerals (Potassium, Iron), antioxidants, alkaloids, flavonoids, vitamins, folic acid, Vitamins A, K and C, lecithin. Lecithin hydrates the hair and gives strength to the roots or hair follicles. As it is rich in Potassium and Iron it prevents premature hair greying and stimulates the hair regrowth[7]. Antioxidants have been used as anti-lice, antidandruff activity. Traditionally fenugreek has been used for various pharmacological effects, such as anti-diabetic, anti-cancer, anti-fungal, anti-pyretic, anti-bacterial[8].

3. Shikakai:

Botanical name for Shikakai is *Acacia concinna* is from family Leguminosae. Every part of Shikakai possesses medicinal properties. In Sanskrit it is known as Saptala, in English it is known as a soap pod[9]. The powder of shikakai shows the presence of saponins, alkaloid, tannin, anthraquinone glycosides, sugar, and flavonoids. Extract of pods is used as a hair cleanser and for the control of dandruff. The fruits of this plant are used for improving hair growth, washing hair, as an emetic, expectorant and purgative[10].Saponin is the main surface-active agent which exhibit foaming properties[11]. Shikakai has rich amount of Vitamin C, which is beneficial for hair. *Acacia concinna* naturally lowers pH value and retains the natural oils of the hair and maintains them lustrous and healthy. It is also effective in strengthening and conditioning hair[12].

4. Ginger:

Botanical name for ginger is *Zingiber officinale* belongs to the family of Zingiberaceae. It is obtained from the roots of *Zingiber officinale*. Synonyms for ginger are Adrak, Gingerin, Zingiber, zingiberis. It contains Zingiberene and the Shogaols is well known for its nutraceutical value. The active ingredients and anti-oxidant, i.e., Gingerol found in ginger helps to relax the blood vessels and improves the circulation of blood to the hair follicles. It also stimulates the growth of the hair and prevents hair thinning and renders hair to be glossy and smooth. Additionally, is helpful in the treatment of dandruff and irritated, itchy scalp. Ginger contains natural anti-inflammatory and antiseptic properties that keeps the skin clean and healthy[13].

5. Citrus sinesis:

Botanical name for orange is *Citrus sinesis* belongs to family of Rutaceae. It is obtained from orange peel which is dried or fresh outer part of the pericarp of ripe or nearly ripe fruits of *Citrus sinensis*. *Citrus sinensis* is also called as orange or sweet orange which is firstly found in areas of tropical Asia[14]. Orange peel are rich in Limonene, (S) - Linalool, Pectin, Octanal, Decanal, esters, Aldehydes and also essential alcohols[15]. Orange peel is used to get long and strong hair, decrease hair fall, improves hair quality. Limonene and Pectin is rich in antioxidant property thus prevent hair greying and provides protection from UV radiations and also controls

sebum production. For dandruff, its anti-inflammatory and antiseptic property is beneficial[14].

6. Hibiscus:

Botanical name for Hibiscus is *Hibiscus rosa sinensis* belongs to the family Malvaceae. It is obtained from the flower of *Hibiscus rosa sinensis*. It is used for growth of hair, its regrowth, and hair loss. Hibiscus constitutes Vitamin A, C and Vitamin B12, amino acids, Riboflavin and Niacin along with other nutrients that are highly useful for hair and scalp[15]. In herbal formulations hibiscus petal is used to enhance thicker hair growth and to prevent premature greying, scalp disorders and hair loss. A petal extract acts as a natural hair conditioner and can be used in hair washes[16].It is well accepted as the whole of hibiscus like roots, flower, stem, and leaves had been used as traditional medicine. The flowers generally used in herbal teas and food colouring and in some countries, they are eaten as pickles or salad. The leaves of hibiscus have been used in healing processes due to their antioxidant, antityrosinase, and antibacterial activities[17].

7. Bhringraj:

Botanical name for Bhringraj is *Eclipta alba (L.) hassk* belongs to the family Asteraceae. It is obtained from the leaves of *Eclipta alba*. It is commonly known as Bhringraj in India and false daisy in English[17]. It embodies flavonoids and isoflavonoids. It is a good source of Iron, Calcium, Magnesium and also Vitamins D and E. Bhringraj works wonders to treat hair greying, thinning of hair or reduction in hair density etc. The extract of leaves penetrates deep into the skin of scalp and provides moisturization to the scalp deeply and therefore helps to treat scalp itching and dandruff. The Beta-sitosterol and Wedelolactone are the phytochemicals responsible for hair growth activity[18].It mainly consist of coumestans (Wedelacton and Dimethyl wedelactone), glycosides, (beta-amyrin), alkaloid (ecliptine), triterpenic acid and steroids (ecalbasaponins)[16].

8. Flaxseeds:

Botanical name for Flaxseeds is *Linum usitatissimum* belongs to the family Linaceae. It is obtained from the seeds of *Linum usitatissimum*. It is also known as linseed. Flaxseed is an important functional food ingredient, because of its rich contents of Alpha-linolenic acid (ALA); Omega-3-fatty acid provides vitamins, proteins and nutrients to hair and scalp. Omega-3-fatty acid inhibits hair follicle inflammation and helps in reducing hair loss. It promotes circulation in the scalp that promotes hair growth. Alpha-linolenic acid shows anti-inflammatory activity and it provides nourishment and nutrients to scalp. Antioxidants produces by flaxseed is lignans. Lignans may help to suppress or inhibit bacterial growth Lignans may help in regeneration of hair and reduces hair loss. Vitamin E is antioxidant is readily available in flaxseed which stops hair fall and provides nourishment to hair. Flaxseed is consistent source of Vitamin B complex. Vitamin B complex is a group of nutrients that are recognised for making hair stronger and healthier at more rapid rate[19].

9. Castor oil:

Botanical name of castor oil is *Ricinus communis* belongs to the family Spurge (Euphorbiaceae), which is a vegetable oil that has high nutritional property. It is obtained seeds of *Ricinus communis* by cold expression. It belongs to tropical East Africa and is commonly used in the countries like India and West Indies for its cosmetic and medicinal properties. It can be also said as black castor oil. Castor oil is long-chained fatty acid. Fatty acids provide essential proteins and nutrients and prevent inflammation of hair follicles. Castor oil contains 90% of Ricenoleic acid (fatty acid). It dilated the blood vessels that eventually increase the supply of blood oxygen-rich and nutrient-rich level to the follicle's powerhouse, dermal papilla, or hair root[20].

10. Amla:

Botanical name of amla is *Phyllanthus embelica* belongs to the family Euphorbeaceae. Amla is also known as Indian gooseberry. It is obtained from fruit of *Phyllanthus embelica*. This plant is originally found in India but today is also found in Pakistan, Sri Lanka, China, Southeast Asia and Malaysia. It contains Vitamin C, Phyllemblin, Tannin, Phosphorus, Iron, and Calcium1. Vitamin C in amla treats the dryness and prevents the accumulation of dandruff. Powdered Amla can be used as an essential of hair tonics, required to enhance hair growth and improve hair pigmentation. It gives strength to the roots, maintains the colour, and improves luster. Application of the amla oil to the roots of hair improves hair growth and colour. The main use is to decrease baldness and hair loss. This property is due to the presence of tannic acid, ellagic acid, gallic acid, iron and antioxidant material that prevents free radial damage to hair follicles, caused by dandruff[21].

11. Henna:

Botanical name of Henna is *Lawsonia inermis* belongs to the family Lythraceae.It is obtained from the leaves of *Lawsonia inermis*. It is also known as Mehendi. This plant belongs to the countries like India, Morocco, Sudan, and Egypt. It contains lawsone, gallic acid, glucose, flavonoids, carbohydrates, resin (2%), mannitol, fats and traces of an alkaloid. Leaves of henna gives hennatannic acid and an olive oil green resin. It mainly known for its high amount of vitamin C and for the precious oil, which is extracted from its seeds and pulp and used for treatment of hair and scalp problems[22]. Lawsone is principle colouring ingredient, a red orange compound present in dried leaves of the plant in a

concentration of 11.5% w/w. Lawsone acts as a non-oxidizing hair colouring agent. Flavonoids and gallic acid acts as an organic mordants to the process of colouring. Carbohydrates gives consistency to the henna paste for adherence to the hair. Henna prevents premature hair fall by adjusting the pH of the scalp. Henna leaf paste used for alleviating jaundice, smallpox, skin diseases, etc. Henna also has antifungal activity against Malassezia species[11].

12. Reetha:

Botanical name of reetha is *Sapindus mukorossi* that belongs to the family of Sapindaceae. It is obtained from the fruit of *Sapindus mukorossi*. Commonly, it is well known as soapnuts. Reetha mainly found in the hilly areas of Himalayas. Common names for reetha are haithaguti in Assamese, aritha in Hindi, ritha in Bengali, Punjabi etc. Reetha constitutes different types of oleanane, dammarane, triterpenes etc. Due to presence of saponins, soapnut is used for its detergent and insecticidal properties. Because of insecticidal property it was also used as a lice removal from the scalp. The major constituents isolated from the fruit of reetha are saponins, flavonoids, fatty acids, triterpenoids that are known for its antimicrobial, anti-inflammatory, insecticidal, fungicidal and ant diabetic properties. It is popular ingredient in herbal formulations like hair shampoos, cleansers. It is also used in treatment of eczema, psoriasis[23].

13. Coconut oil:

Botanical name of coconut is *cocos nucifera* belongs to the family Areacaeae. It is obtained from the fruit or seed of coconut palm tree. It is also known as coconut butter, copra oil. It is mainly cultivated in African and southeast Asian countries. It is obtained by crushing the part called as copra and the dried kernel of the dried coconut fruit. It constitutes of about 60-65% of oil. The melting point of the coconut oil is 24 to 25°C[22]. Coconut oil is rich in triglycerides, it is composed of fatty acids, lauric acid, capric acid, oleic acid, linoleic acid, stearic acid, palmitic acid. Lauric acid present in the oil act as a moisturizing agent and possess antimicrobial activity. Coconut oil is rich in essential nutrients and antioxidant properties that prevent scalp infections and promotes hair growth[24].

14. Curry leaves:

Botanical name of curry leaves is *Murraya koenigii* belongs to the family Rutaceae. It is obtained from the leaves of *Murraya koenigii*. It is small yet strong aromatic perennial shrub. Common names for curry leaves are karipatta, mitha neem patta in Hindi, daun kari in Indonesian, kari patah in Urdu. It is majorly cultivated in Indian and is used as natural flavouring ingredient[25]. It consists of proteins, fibre, minerals, carbohydrate, nicotinic acid, carotene, vitamin C, vitamin A, oxalic acid and calcium. It also contains other chemical constituents such as crystalline glycosides, triterpenoids curry leaves prevent hair thinning and hair loss as it is rich in beta-carotene and proteins[26]. Curry leaves infused oil is mainly used for hair regrowth as well as promotes shiny, strong, thick and fast hair growth. Curry leaves conditions the hair, stops premature greying and has anti-bacterial effect. Curry leaves has high number of antioxidants such as vitamin A, C, E, folic acid and minerals such as iron so curry leaves are truly nourishing for hair[15].

15. Nigella Sativa:

Botanical name of black cumin is *Nigella Sativa* belongs to the Ranunculaceae family. It is obtained from the seeds or dried seeds of *Nigella Sativa*. It is commonly known as nigella, black caraway, fennel flower and kalonji in Urdu. It has significant number of essential components such as zinc, copper, iron, calcium, phosphorous, thiamine, niacin, folic acid, etc[27]. It is an annual flowering plant native of India and Pakistan. It consists thymoquinone (TQ), thymol, thymohydroquinone (THQ), dithymoquinone (DTQ) that are demonstrates anti-inflammatory behaviour of black cumin. Thymoquinone has anti-inflammatory and antioxidant property can reduce split hair and prevents greying of hair. Black cumin oil possesses antifungal properties that are beneficial to treat dandruff and the oil maintains the moisture content in scalp, thus helps in protecting the scalp condition[20].

16. Aloe Vera:

Botanical name of aloe vera is *Aloe barbadensis miller* belongs to the family Liliaceae. It is obtained from the dried juice collected by incision from the bases of the leaves of various species of Aloe. Synonyms for Aloe vera are Aloe indica royle, aloe vulgaris lam. It constitutes amino acids such as leucine, isoleucine, saponin glycosides which provide cleansing action, vitamins A, C, E and vitamin B complex, choline consists of anti-oxidant properties[10]. Aloe consists of about 75 potential active ingredients namely Vitamin, Salisylic acid, Liganins, Enzymes, Minerals, and Sugar, etc[28]. It is employed in cosmetics due to its healing, moisturizing and emollient property provided to the skin[10]. Aloein is the active chemical constituents responsible that exhibits hair growth without any skin irritation. It is a natural conditioner that conditions the hair makes them soft and shiny[15].

17. Brahmi:

Botanical name of brahmi *Bacopa monnieri* belongs to the family of Umbelliferae. It is obtained from leaves, roots and flower of *Bacopa monnieri*. Synonyms for brahmi are mangosteen, Indian pennywort. It grows in tropical regions, in India, generally brahmi is found in wet and marshy areas of North India. Brahmi made up of

sterols, glycoside, essential oils, alkaloids, triterpenoid, saponin and flavonols. The active element in Brahmi is alkaloids that potentiates the hair growth and reduces hair loss. Brahmi has also property of delaying aging signs in body like greying of hairs. It is also claim to boost memory, relieve mental fatigue, ease Alzheimer's disease and is rich in antioxidants[16].

18. Marigold:

Botanical name of marigold is *Tagetes*, a genus which comprises of many other species belongs to family of Asteraceae. It is also known as Scottish marigold in English, common marigold, ruddles. It is an ornamental flower more commonly used in India. It is also used for its medicinal properties intended both internally and externally. It contains chemical constituent such as lut**e**in, linalool, limonene, ocimene, etc. This plant also shows properties such as antimicrobial, antifungal, antioxidant, antiviral, antipyretic and also acts as a blood purifier. Linalool prevents hair loss and antioxidant property of marigold prevents premature greying of hairs[29].

19. Tulsi:

Botanical name tulsi is *Ocimum sanctum* belongs to the family Lamiaceae. It is obtained from the leaves of *Ocimum sanctum*. It is also known as basil, holy basil, etc. It is majorly found in Southeast Asia but India is the largest source[32]. In India, more than 8000 species of vascular plant from which 1748 are considered for their therapeutic use[30].It contains Vitamin K, alkaloid, glycoside, saponin, antioxidants which is the remedy for hair loss. Tulsi functions by strengthening the roots of hair thus supressing hair fall and reduces bacterial and fungal infections[15].It has also analgesic, antioxidant, antiulcer, immunomodulatory, antistress, chemo preventive, etc. properties[30]. It helps to promote blood circulation and keeps the scalp calm, thereby reducing irritation and dandruff, hence promotes hair growth[21].

20. Onion:

Botanical name for onion is *Allium cepa* that belongs to the family Liliaceae. It is obtained from the roots of *Allium cepa*. It also known as common onion or bulb onion. It contains numerous active constituents like Protiene, Diallyl sulphide, Alliin, Allicin. It also contains minerals like Potassium. Calcium, Zinc, Magnesium. It has various pharmacological properties such as antimicrobial, antioxidant, antidiabetic properties. Onion juice contains sulphur is beneficial in treatment of patchy baldness and also prevents baldness. Zinc helps to secrete the scalp with oil and avoid dandruff that may cause hair loss. Iron is involved in oxygenation of body's red blood cells[31].

CONCLUSION:

The presented paper provides brief information about various herbs that have been traditionally used in the hair care but were yet least known to the people. It summarizes about the various active chemical constituents, other used of the herb that has potency to treat or cure various hair as well as other problems associated with human body. Herbal industry has a progressive future in cosmetics as compared to synthetic formulations as the herbs are potent, effective and safe to use.

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