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Review Article

**A REVIEW ON THE ROLE OF HERBS IN HAIR CARE:
EXPLORING THEIR POTENTIAL APPLICATIONS****V. Anusha^{1*}, Nittala SeshaSarvani², P. Moulika³**

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Abstract:

Hair care is considered as a crucial aspect in human life as hair is considered to be one of the signs of beauty. Various scalp and hair problems are observed among individuals including hair loss, hair thinning, dandruff, excess oil and sebum production, alopecia, etc. To overcome and combat these hair related issues and to stimulate hair growth, prevent hair loss and associated problems people are looking for natural herbal remedies. The herbal products are gaining interest due to lower risk of side effects and the possible side effects observed with synthetic chemical products. In this review numerous herbs utilized in hair care for their incredible uses are summarized, including their sources, phytoconstituents and their hair care property. Plants including Shikakai, Neem, Fenugreek, Hibiscus, Bhringraj, Amla, Onion, Henna, Tulsi, Brahmi, Green Tea, Rosemary, Thyme, etc have been discussed. They have been traditionally utilized to promote hair growth, prevent hair loss, premature greying of hair, reduce dandruff, improve hair texture and gloss, conditioning the scalp and hair. These plants comprises of numerous bioactive compounds, like saponins, amino acids, flavonoids, alkaloids, volatile essential oils, tannins, antioxidants, vitamins which contribute to hair care benefits. Various herbal preparations, including oils, shampoos, conditioners, utilize these herbs to provide hair care benefits. These herbs are used traditionally for hair care, even though further scientific studies and clinical investigations are required to establish their efficacy, safety, mechanisms of action. Herbal products are therefore considered natural and safe formulations for effective hair care, promoting healthier and stronger hair.

Keywords: Hair Care, Hair loss, Hair Growth, Herbs, Safety, Conditioning.

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INTRODUCTION:

Hair is considered as one of the most important features that enhances a person's overall appearance and beauty. Thus, it is essential to take proper care of hair to maintain it healthy, strong, and beautiful. It is a keratinized, filamentous structure which grows from hair follicles present in the skin and primarily composed of a tough protein called keratin. Hairs are the outgrowths from the follicles present on the skin. Hair is essentially composed of keratin protein, along with slighter amounts of water, lipids, pigments, and minerals. In vertebrates, hair is chiefly composed of α -keratin (alpha keratin), a fibrous structural protein rich in the amino acid cysteine that is responsible for growth of hairs. The scalp is a significant component of the human hair system. It is comprised of soft tissue layers which covers the cranium and area of the head where hair growth is observed. It is constituted with several hair follicles and sebaceous glands, which are important for maintaining the health of the scalp and hair [1].

Various hair problems are observed due to extreme heat, dirt, pollution, changing environment, excess sebum production, etc. The hair problems like Hair loss, Hair thinning, dandruff, Split ends, Dryness and roughness, alopecia are observed. Dermal papilla cells, which are comprised of mesenchymal and epithelial derived root sheath cells, will make up the hair follicles. There stages in the hair growth cycle, includes anagen, catagen, and telogen phases indicating growth, transitional, and resting, phases respectively.

Hair care products are the formulations which are utilized to cleanse the hair, provide nourishment to hair, modify the hair texture, promotes hair growth, provides conditioning to hair, controls hair problems like dandruff, manages premature greying of hair and to maintain healthy hair. Herbs have been used in hair care across various cultures from ancient times. Ancient civilizations all over the world have discovered the therapeutic properties of herbs and utilized them to maintain and promote hair health, support hair growth, and enhance the natural beauty and appearance of hair [1]. In ancient Egypt, Aloe Vera was utilized for soothing and moisturizing properties, henna was utilized for hair coloring and conditioning properties. In India, herbs have been utilized in the Ayurvedic traditions and various herbs like Amla, Neem, Brahmi, etc, have ben emphasized for their nourishing and hair strengthening properties. Formulation of hair care products with herbs provide various advantages and reduced risk of side effects in comparison to synthetic chemical components. The various herbal hair care preparations includes hair oils, shampoos, conditioners, hair packs, hair tonics, hair creams, etc.

Advantages of Herbal products [1, 2]

The herbal hair care products have gained popularity in comparison to synthetic products because of several advantages including the following

- They are composed of natural ingredients obtained from plant herbs, and are less likely to initiate allergies or irritations in comparison to products composed of synthetic chemical
- They provide nourishment to the hair and numerous herbal ingredients, like aloe vera, coconut oil, etc are recognized for their nourishing and moisturizing properties and they improve hair health, imparts shine to hair and decrease dryness,
- Side effects like scalp irritation, hair damage, etc are observed with synthetic hair care products while herbal products reduce the risk of side effects and are considered milder.
- Herbal products usually have pleasant natural scents due to the presence of essential oils and botanical extracts, which provide soothing and calming effects
- Herbal constituents are believed to exhibit properties like antimicrobial properties, example, tea tree oil which can assist with management of dandruff.
- Herbal products often contribute to long term hair health and vitality
- For centuries form Ancient history and Ayurveda herbal ingredients have been used for in various cultures for their efficient hair care properties.

Herbs for Hair Care

Medicinal plants are composed of numerous constituents like saponins, flavanoids, polyphenols, tannins, alkaloids, terpenoids, proteins, amino acids, antioxidants, vitamins, minerals, fatty acids, etc, that are beneficial in providing hair care and treatment of various conditions of hair and scalp along with maintaining scalp health. Currently people are interested towards natural, herbal and formulations which are known for lower side effect or no side effects. In comparison to synthetic products, herbal products will not produce major side effects and are usually safer. Few herbal materials used in hair care are discussed below

Shikakai

The biological source includes the dried, ripe pods of *Acacia concinna* which belong to family Leguminosae. The each and every part of Shikakai is comprised of medicinal properties. The Shikakai powder is composed of various components including saponins, anthraquinone glycosides, alkaloid, tannins and flavonoids. The extract of Shikakai pods is utilized as a hair cleanser and also

for controlling dandruff. The fruits of plant are used for promoting hair growth, cleansing and washing hair. The Saponins are the chief surface active agent which provides foaming properties. It has high amount of Vitamin C, which is considered to be beneficial for hair. It naturally reduces pH value and preserves the natural oils of hair and maintains them glossy and healthy. It is also found to be effective in strengthening hair and also acts as a conditioner [3].

Neem

It is obtained from *Azadirachta indica* which belongs to family of Meliaceae. It is comprised of constituents like Nimbin, Nimbidin, Azadirachtin, Gedunin, Nimbolide, flavonoids like Quercetin, tannins and fatty acids etc. The complete tree retains medicinal properties and leaves exhibit hair care properties in comparison to other parts of the tree. Nimbin, Nimbolide, Nimbidol, etc are rich in leaves and can be utilized in the treatment of hair problems. Quercetin exhibits antifungal and antibacterial activities. It exhibits antimicrobial and anti-inflammatory properties, and used in effective management of conditions like dandruff and scalp irritation. It cleanse the scalp, eradicate excess oil, and support healthy environment for hair growth. The antioxidants present along with essential fatty acids provides nourishment to hair and scalp, which produces hair with improved texture and shine. It is utilized in the form of oil or neem infused shampoos, it plays a key role in conserving healthy scalp with clean, strong, beautiful hair [3].

Fenugreek

The Biological source includes dried seeds of *Trigonella foenum graecum* which belongs to family of Leguminosae. It comprises of alkaloids like trigonelline, flavanoids like diosgenin, yamogenin and various micronutrients including few Vitamin B complex. The seeds of fenugreek also contains an extensive range of saponins, alkaloids, flavonoids, minerals like Potassium, Iron, antioxidants, vitamins like Vitamins A, K and C, folic acid, etc. It has been used in hair and scalp care due to its conditioning, soothing, antioxidant, and scalp supporting properties. It hydrates the hair and provides strength to hair follicles and roots. The abundant sources of Potassium and Iron in the seeds might also inhibit early premature hair greying and also stimulates the hair regrowth. Fenugreek has been used for scalp and dandruff related conditions, and its antioxidant constituents might contribute to this activity. The constituents in fenugreek supports hair growth, strength, improves blood flow to scalp, provides conditioning effect, delays premature greying and maintains scalp health [4].

Ginger

It is obtained from rhizomes of *Zingiber officinale* which belongs to family of Zingiberaceae. It is composed of constituents like Zingerone, Zingiberene, gingerols, cedrol and Shogaols (exhibit

antioxidant properties). The Gingerol can helps in relaxation of blood vessels which stimulates circulation of blood to hair follicles. It can stimulate hair growth and might assists in prevention of thinning of hair with improving smoothness and gloss of hair. It support in treatment of dandruff and maintain scalp health [5].

Hibiscus

The biological source includes the flower petals of *Hibiscus rosa-sinensis* L. belonging to the family Malvaceae. The flowers and petals of hibiscus are widely used in traditional hair care preparations. It comprises of various bioactive compounds, including flavonoids, phenolic compounds, amino acids, and antioxidant constituents that may contribute to maintaining healthy hair and scalp. It contains anthocynains, flavanoids, organic acids, Vitamins like A, C, amino acids, minerals like calcium, iron, which are extremely useful for hair and scalp health maintenance. The different parts of the plant, including the roots, stems, leaves, and flowers, have also been used traditionally for various medicinal purposes. It is used in herbal preparations to enhance hair growth and for controlling premature greying of hair, to reduce hair loss and to improve texture of hair. The extracts of petals also used as hair conditioner. The leaves and flowers of hibiscus are also used in herbal preparations for maintaining scalp health and in dandruff management [5, 6].

Bhringraj

It is obtained from leaves of *Eclipta alba* (L.) which belongs to the family Asteraceae. It is commonly known as Bhringraj in India. It is composed of coumestans like wedelolactone, Dimethylwedelactone flavonoids like apigenin, alkaloids like ecliptine, triterpenoids and saponins like eclabasaponins, along with Iron, Calcium, Magnesium, Vitamins D and Vitamin E. It is mainly used to improve hair growth, hair strength and hair blackening. It is the key component of numerous hair oils. It efficiently manages conditions like premature greying, dandruff and hair loss. The hair colors can be prepared from black dye attained from *Eclipta alba*. It is also used in cases of androgenic alopecia treatment, where it can help in hair growth treatment. It usually promotes hair growth by expansion of the anagen phase. The extract of leaves usually penetrates deeper into the skin of scalp and provides moisturization to the scalp and helps to treat scalp itching and dandruff. The coumestans like Wedelolactone are the phytochemicals responsible for hair growth activity by managing cellular follicle activity [7].

Brahmi

It is obtained from leaves, flower of *Bacopa monnieri* which belongs to the family Plantaginaceae family (Scrophulariaceae). It is also known as mangosteen, Indian pennywort. It is

composed of alkaloids like brahmine, herpestine, triterpenoid saponins like bacosides, flavonoids like epigenin. sterols, glycoside, essential oils. It also exhibits antioxidant properties. They help in the hair growth, management of dandruff and reduction of hair loss. It is also helpful in management of conditions like greying of hair [7].

Tulsi

It is obtained from the leaves of *Ocimum sanctum* L. which belongs to the family of Lamiaceae. It is usually known as holy basil. It constitutes of volatile component eugenol, triterpenoids like ursolic acid, terpenes like Linalool, carvacrol, flavanoids like orientin and lower quantity of alkaloids along with Vitamin K, saponins, antioxidants, etc which are useful for hair care. It assists in strengthening the hair roots and also helps in reduction of hair fall. It stimulates blood circulation and assists in management of scalp health along with dandruff control and helps in hair growth. It helps in management and control of premature greying of hair and helps in treating various fungal infections [8]

Flaxseeds

It is obtained from the seeds of *Linum usitatissimum* which belongs to the family Linaceae. It is also generally known as linseed. It is considered as efficient food ingredient, since it is rich in Alpha-linolenic acid (ALA) an Omega-3-fatty acid, secoisolariciresinol diglucoside (SDG), vitamins like E, B complex, proteins and nutrients which improve hair and scalp health. These Omega-3-fatty acid could prevent hair follicle inflammation and in turn assist in diminishing hair loss. It also stimulates circulation in the scalp that helps in hair growth. The Alpha-linolenic acid exhibits anti-inflammatory properties and provides nutrition to scalp. Lignans present in flaxseed act as antioxidants that help to reduce or inhibit bacterial growth and could reduce hair loss with hair regeneration. The Vitamin B complex and E in the seeds prevents hair fall and offers nourishment to hair [9].

Reetha

It is commonly known as soapnut. It is obtained from the fruit of *Sapindus mukorossi* which belongs to the family Sapindaceae. The main constituents isolated from fruit are saponins, flavonoids, fatty acids, triterpenoids which are commonly known for different properties like antimicrobial, anti-inflammatory, insecticidal, fungicidal etc. The presence of saponins, produces surfactant properties, detergent activity and insecticidal properties. It is widely used ingredient in formulation of herbal products like shampoos, cleansers, etc [10].

Henna

It is obtained from leaves of *Lawsonia inermis* which belongs to family of Lythraceae. It is also commonly known as Mehendi. It is composed of

lawsone (the active dye molecule), tannins like hennotannic acid, gallic acid, flavonoids. Lawsone is chief colouring ingredient, present in leaves of the plant. Lawsone acts as a nonoxidizing hair colouring agent. Flavonoids and gallic acid acts as an organic mordants for the colouring process. It prevents premature hair fall by pH regulation of scalp. Hennotannic acid rich leaves are usually used as natural coloring ingredient for hair, skin, and nails. It is widely used natural hair dye for coloring and conditioning properties [11].

Aloevera

It is obtained from the leaves and juice collected from the leaves of *Aloe barbadensis* miller which belongs to family of Liliaceae. It is composed of aloin, aloemodin, amino acids saponins which exhibit cleansing action, vitamins like A, C, E, folic acid, antioxidants, minerals like zinc, magnesium, copper, calcium. It is composed of about 75 ingredients like Vitamins, Salicylic acid, Lignans, Enzymes, Minerals, and Sugar, etc. Research indicates that Aloenin present in aloe vera plant stimulate follicle activity, improves blood circulation which in turn limits hair fall and stimulates hair growth.. The presence of all these constituents help in maintaining healthy hair follicles and provides natural conditioning properties which makes hair soft and shiny [11].

Nigella Sativa

It is known as black cumin, black caraway, kalonji etc. it is obtained from the seeds or dried seeds of *Nigella Sativa* which belongs to family of Ranunculaceae. It is composed of wide variety of substantial essential components like thymoquinone, thymol, thymohydroquinone, dithymoquinone, folic acid, niacin, thiamine, zinc, copper, iron, calcium, phosphorous,. It helps in reducing split hair along with management of grey hair, preventing hair loss, management of dandruff and exhibits anti-inflammatory activity due to presence of Thymoquinone. It shows antifungal properties and assists in treating dandruff along with managing hair growth and scalp health [12].

Curry leaves

It is obtained from leaves of *Murraya koenigii* which belongs to the family of Rutaceae. It is also commonly known as karipatta. It is composed of carbohydrates, proteins, nicotinic acid, carotene, vitamins like A and C, folic acid, calcium, fibre, minerals, crystalline glycosides and triterpenoids. The rich composition of beta-carotene and proteins in it assists in prevention of thinning of hair and hair loss. Oils infused with curry leaves are usually utilized for producing strong, thick, shiny hair with improvement in hair growth. It is also used in management of premature greying of hair and exhibits anti-bacterial effects. It is also rich in antioxidants and vitamins which helps in nourishment of hair [13].

Amla

It is also well-known as Indian gooseberry. It is obtained from the fruits of *Phyllanthus embelica* which belongs to the family Euphorbeaceae. It is composed of Vitamin C, gallic acid, ellagic acid, flavanoids, Phyllembelin, polyphenols, tannin, Phosphorus, Iron, and Calcium. It removes oil, dust, from the scalp and also acts as a natural conditioner. The Vitamin C helps in management and prevention of dandruff accumulation. In essential air tonics for improving hair growth and pigmentation powdered Amla can be utilized. Amla strengthens the roots of hair, maintains luster and hair colour. It also helps in treatment of baldness and hairloss due to the presence of tannic acid, ellagic acid, gallic acid, iron and antioxidants which works by preventing damage of hair follicles by free radicals, due to dandruff. The hair follicle growth and their repair is assisted by flavonoids. The tannins also assists in strengthening hair cuticle [14].

Marigold

It is obtained from the flowers of genus *Tagetes*, comprising of many species which belongs to the family of Asteraceae. It is composed of chemical constituent like lutein, linalool, limonene, ocimene, etc and exhibits antimicrobial, antifungal, antioxidant, antiviral, antipyretic properties. The component Linalool helps in prevention of hair loss and the antioxidant property of marigold helps in prevention and management of premature greying of hair [15].

Onion

It is obtained from bulbs of *Allium cepa* which belongs to family of Amaryllidaceae (Formerly Liliaceae). It is comprised of various constituents like allicin, Diallyl sulphide, flavanoids like quercetin, vitamins like C, B6, B9, minerals like Potassium, Calcium, Zinc, Magnesium. It exhibits antimicrobial, antioxidant, antidiabetic properties. Onion juice comprising sulphur is useful in treatment of patchy baldness. The presence of Zinc helps in treating dandruff and managing scalp health. Onion juice provides nourishment to follicles and also reverse premature hair greying. It stimulates blood flow and circulation which in turn helps in hair growth and reduces hair loss. The sulphur content in onion juice helps in vital collagen synthesis which assists in hair growth [15].

Rosemary

It is obtained from fresh or dried leaves and flowering tops of *Salvia rosmarinus* (initially known as *Rosmarinus officinalis*) which belongs to the family of Lamiaceae. It is composed of volatile terpenoids like 1,8- cineole, camphor and non-volatile components like rosmarinic acid, carnosol, ursolic acid, etc. It stimulate scalp blood circulation and reduces dandruff. It promotes healthy hair development, exhibits antibacterial properties. It

also strengthen hair and prevent hair loss by reducing hair breakage and promoting overall hair health. Its natural astringent properties assist to control excess oil production, and manages scalp health and conditions [16].

Coconut Oil

It is obtained from the dried endosperm of fruit of *cocos nucifera* which belongs to the family of Areacaceae. It is usually produced by the process of crushing the dried kernel of dried coconut fruit. It is composed of about 60-65% of oil and exhibits melting point in the range of 24 to 25 °C. Coconut oil is composed of fatty acids like lauric acid, capric acid, oleic acid, linoleic acid, stearic acid, palmitic acid, vitamin E, etc. These constituents assists in producing moisturizing effects. The rich composition of nutrients and antioxidant in coconut oil prevents scalp infections and supports hair growth [17].

Green Tea

It is obtained from the leaves and buds of *Camellia sinensis* which belongs to the family of Theaceae. It has significant benefits in hair care. It is composed of antioxidants like catechins, which protects the hair follicles from free radical induced damage and also from environmental factors. It is also composed of amino acids, vitamins like E, C, minerals like zinc, etc. It reduces scalp irritation, dandruff, hair loss and soothes scalp. It improves hair growth by improving blood circulation to scalp, supports scalp health, manages oil secretion in scalp, thus used in many hair products including shampoos, conditioners etc [18].

Thyme

It is obtained from *Thymus vulgaris* which belongs to the family of Lamiaceae. It is rich in thymol, carvacrol, terpenes, apigenin, minerals like iron, potassium, vitamins like C, E, etc. It helps in scalp nourishment and promotes hair growth. It exhibits antimicrobial properties helps in management and control of dandruff and soothes the irritated scalp. Hair care products like shampoos, conditioners and hair oils are usually infused with thyme which supports in strengthening of hair follicles and improvement of scalp health. It improves blood circulation, provide anti-inflammatory, antioxidant properties and supports hair care [18].

Sage

It is obtained from *Salvia officinalis* which belongs to the family of Lamiaceae. The rich composition of essential oils like α -thujone, β -thujone, triterpenoids, flavanoids, tannins and antioxidants. These constituents in sage assists to increase blood circulation to scalp, which in turn promotes hair growth and reduces hair loss. It also prevents premature greying of hair and produce shine to the hair. It helps to relieve dandruff and soothe irritated scalp due to its antimicrobial properties. The astringent properties in sage could help in control

and management of excess oil production. It can be utilized as an ingredient in shampoos, oils and conditioners for maintaining healthy and strengthened hair and scalp [18].

Ginkgo Biloba

It is obtained from leaves of *Ginkgo biloba* which belongs to the family of Ginkgoaceae and usually known as maiden tree. It is composed of constituent's like Ginkgolides, bilobalide, ginkgolic acids, flavonoid glycosides like quercetin, isorhamnetin, etc. It is generally utilized in traditional medicine, these constituents in it promote blood circulation which in turn stimulates hair growth. They also exhibit anti-inflammatory and antioxidant properties which supports hair care [19]

Jatamansi

It is obtained from dried Rhizomes and roots of *Nardostachys jatamansi* which belongs to the family

of Valerianaceae. It is composed of constituents like jatamansic acid. Valeranone, bornyl acetate, 1, 8-cineole, etc. The constituents helps in follicular enlargement, continuation of anagen phase and promotes hair growth, also delays premature greying of hair along with management of scalp health [19].

Walnut

It is obtained from *Juglans regia* which belongs to the family of Juglandaceae. It is composed of Omega-3 Fatty Acids (Alpha-Linolenic Acid), vitamin E, biotin, hexadecane, nonacosanol pentadecane, bicyclogermacrene, and spathulenol. It hastens hair growth and moistures scalp. It constitutes of essential minerals which helps in healthy hair growth. The Iron in it improves blood circulation and oxygen supply. The presence of Zinc prevents dandruff, and helps oil production management [19, 20].

The herbs used in hair care are presented in table 1.

Table.1. Herbs Used in Hair Care

Plant	Image	Plant parts used for hair care
Shikakai		Fruit (pods)
Neem		Leaves, bark
Fenugreek		Seeds
Ginger		Rhizome

Hibiscus		Flowers, leaves
Bhringraj		Leaves (Whole Plant also used)
Brahmi		Leaves, aerial parts
Tulsi		Leaves
Reetha		Fruit
Henna		Leaves
Aloe vera		Leaves (gel)
Nigella sativa		Seeds

Curry leaves		Leaves
Amla		Fruit
Marigold		Flowers
Onion		Bulb
Rosemary		Leaves, essential oil
Green Tea		Leaves
Thyme		Leaves, (Flowering tops)

Sage		Leaves
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CONCLUSION:

Herbal products are gaining popularity in the market since they offer a beneficial approach to hair care. Plants are composed of numerous phytoconstituents and materials which help in promoting hair growth, preventing premature greying of hair, hair loss, imparting conditioning effects, management of dandruff, oil production, and scalp health. The bioactive components in these plants, contribute to their hair care benefits. Herbal formulations offers a natural and potentially effective way to promote hair health. It provides an overview of different herbs used in hair care, their constituents and uses, with emphasis on potential of herbs in preventing and managing various hair related problems. The exploration of herbal plants for hair care provides opportunities to develop natural new formulations in response to increasing consumer requirements for safe and naturally derived hair care products. The herbal industry holds promising potential as the herbal ingredients are considered to be effective and relatively safe for use.

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