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EXPLORING HERBAL HAIR SERUM AS A HAIR GROWTH & PROTECTIVE BENEFIT: A COMPREHENSIVE REVIEW

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ABSTRACT

Hair serum are the type of hair care products that is designed to provide the good nourishment and protection of the hair it is a light wet non greasy liquid contain formula that are applied to it . Onion and hibiscus hair serum is branded hair care product in the market the serum are promotes the important role hair growth reduce frizz and sine to your hair the unique blend of two natural ingredient that can provide more much benefit for hair like that strength of a reduce dandruff and eachiness improve hair structure etc .Nowadays are the progress of hair serum has a good and better hair product about 2023 2024 in all over India with what with advancement in technology and research hair serum become more effective to hair. [1,2]

KEYWORDS -*flaxseed, hibiscus, rice water, hair care,Herbal hair serum,Alopecia, Cosmetics, Onion, Hair care, Hair Growth, etc..[17]*

INTRODUCTION

Hair growth is based on a dynamic and precisely regulated mechanism that is not fully understood. It is a cyclic mechanism involving hair shaft synthesis, elongation, and ultimately shedding. Human hair usually comprises follicles of antigen, catagen, and telogen phases. The hair follicles in the anagen phase actively accumulates cytochrome and easily develop the hair shaft. When the hair follicle matures into the anagen hair follicle, the talogen hair follicle is not to develop neonatal hair shafts.[3] A sound head of hair is portrayed as hair that has gloss, is smooth, long and satiny, fun, with great volume and without any proof of thinning up op and dandruff.[4] To accomplish this, the hair care industry has furnished us with numerous items to improve, upgrade, fortify and to support our hairs.[5]Hair loss is universal distressing condition involving genetic, nutritional, medical, and environmental factors. Androgenic alopecia or male-pattern baldness is the most common cause of hair loss in men, while medical conditions, including hypothyroidism, oralcontraceptives, nutritional deficiency cause hair loss in women. [6,7] Hair loss is a dermatologic disorder, and thus surge for discovering natural products with hair growth promoting potential is continuous. [8,9] Androgens are considered to be one of the most important causes for alopecia apart from a variety of other factors.[10]

Hair care products have additional benefits such as improving hair quality, making it easier to maintain, or repairing damage. [11] There are also excellent products for the treatment of certain hair conditions, such as dandruff. Hait has an aesthetic function in humans, which affects how we look. It now has societal, sexual, and psychological mplications. If a person's hair pattem changes, such as becoming bald or having more or different types of hair, their confidence could suffer. [12] Citrus sinensis, also known as orange peel, has been shown to have a beneficial effect on hair. When used sparingly, these peels can make hair smoother and shinier.

Citrus Synesis, has amazing benefits for your hair. When used daily, these scrubs will make your hair smoother and shinier. Nigella sativa is a period-flowering plant native to Mediterranean countries and India, commonly known as black cumin. Castor oil painting, also known as castor oil. Almond oil helps with its hair-nourishing and skin-softening properties.Hairs are the integral part of human beauty. People are using herbs for cleaning, beautifying and managing hair since the ancient era. As the time has passed synthetic agents have taken a large share but today people are getting aware of their harmful effects on hairs skin and eyes. These regions attracted to community towards the herbal products, which are less expensive and have negligible side effects. Hair care items are wanted to give extra advantages, for example, improving the hair, making it simple to deal with or fixing harms. Moreover, there are exceptional items for the treatment of specific hair issues, for example, dandruff. In human, hair has an aesthetic function impacting our appearance. Today, it has social, sexual and mental importance, Changes in the pattern of the hair, for example, going bald, hair abundance or variety change, may adversely influence the confidence of the individuals. Hair is a complex structure made by many components that act as a unit, with the biological purpose of protecting the scalp and enhancing physical attractiveness. serum is one of the cosmetic products with very high concentration of active ingredient in their formula for providing intensive nutrition to the deeper skin layer and non-greasy finish product which suitable for skin [13]

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Fig – Hair Serum



HIGHLIGHT OF HERBAL HAIR SERUM- [13]

Hair serum is a styling agent that coats the surface of the hair. Hair serum is a liquid hair care product. It's thicker than water. Hair serums are silicone-based styling products that coat the surface of your hair to give it extra shine, moisture, and softness.

Hair serums are applied to wet hair, which is suitable for using hair serums.

1]Straight
2]Wavy
3]Curly
4]Coily

Types of serum available for hair and scalp care

- ➢ Oil based Serum
- ➢ Spray serum
- ➢ Water based Serum
- ➢ Silicone based serums
- ➢ Serums for other issues

ADVANTAGE OF HAIR SERUM

1]Protects hair from environmental influences.
2] Hair serum can effectively soften, smooth and smooth hair.
3) Control frizz.
4) Increase smoothness.
5) Improve straightness and sharpness
6) To protect against damage

DISADVANTAGE OF HAIR SERUM

1. If you continue to use it for a few days, your hair will become heavy, flat and lack luster.
2. Accumulation on the scalp can cause dryness, peeling, and skin irritation.

SIDE EFFECT OF USING HAIR SERUM

1. Normal use and excessive use can cause problems Hair becomes unhealthy and eventually becomes dry.
2. This is what happens when you apply serum to your scalp For inflammation.
3. The silicone contained in hair serum is Long hair is harmful to your hair.
4. Avoid applying to the scalp as much as possible. It can become oily and cause inflammation.

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Benefits of Using Hair Serum:- [14]
It is important to know hair serum benefits before you finalize the product. A hair serum predominantly has the following benefits.
1) Multi Purpose - A hair serum solves a lot of hair issues and not just one problem. There is a reason it is called a one stop solution for all your hair woes. Hair serum transforms a bad hair day into a good hair day. With just a few drops, your hair will feel and look different.
2) Protects Hair- Hair serum forms a layer on hair strands. It thus acts as an excellent protect against heat, sun damage, dirt, dust and pollution. It prevents your hair from getting damaged. This is why it isadvised to use a heat protecting serum before using hot styling tools.
3) Gives Shine to the Hair -The layer formed by hair serum acts as a reflector of light thus making your hair look shiny and lustrous. Hair serumsconsist of amino acids which protect colored and chemically treated hair.
4) Prevents Hair fall From Breakage - When our hair becomes a tangled mess, we tend to lose alot of hair strands because of the wear and tear that goes into detangling. Hair serum acts as a lubricant for such hair and makes detangling easy. And the result is less hair fall.
5) Best for Dry Hair -The most to benefit from hair serums are those who havedry and frizzy hair. Hair serums lock in the moisture and makes hair smooth and shiny.
6) Nourishes Hair and Makes them Manageable - Hair serums fill the follicular cracks and revive brittle and damaged hair. Hair serum makes hair more manageable which further makes it easy to style them. Time, energy, patience. Everything is saved.

HERBAL REMEDIES USE IN HAIR SERUM :- [17]
1. ONION
2. HIBISCUS
3. CURRY LEWF
4. HENNA
5. CASTOR OIL
6. ALMOND OIL
7. VIT E

1 . ONION : - [15 ,16]
The potent of Onion oil contains sulfur, which activates enzymes on the scalp, promoting faster hair growth, resulting in a healthier & shinier hair.

Onion is filled with sulfur and is a trusted antioxidant, which makes it one of the best ingredients to control excessive hair fall, breakage, and thinning. So, when added to a formulation of hair serum, it helps boost hair growth, promotes a healthy scalp, and controls extreme hair fall.

Onion oil or onion extract is sometimes used in hair serums due to its potential benefits for hair growth and scalp health. Here are some possible advantages of using onion in hair serum:

The Onion (Allium Cepa L, from Latin cepa “Onion”), also known as the bulb onion or common onion, is a vegetable that is the most widely cultivated species of the genus Allium. Its close relatives include the garlic shallot, leek, chive and Chinese onion Allium cepa family Liliaceae has been reported to possess antimicrobial, antibacterial, better nourishment, nutrients and also used as hair scalper hair loss.[11,12]

Morphology
1.Synonym: Allium cepa.
2.Family: Amaryllidaceae.
3.Chemical Constituents: allicin, quercetin, fisetin
4.Other sulphurous compounds: diallyl disulphide.
5.Geoghraphical source – It is cultivated in China , India , Europe ,
6 .Use: Hair growth, reduce hair breakage.
7. Molecular mass

The molecular mass of an onion is estimated to be **66 kDa** by Sephadex G-100 column chromatography.
DNA
The onion (Allium cepa) has a haploid genome size of 15.9 Gb, which is 4.9 times the size of a human genome

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Onion Varieties by Region

1. Yellow Onions: Common in the United States, Europe, and Australia.
2. White Onions: Popular in Mexico, the Middle East, and Asia.
3. Red Onions: Grown in the United States, Europe, and Australia.
4. Shallots: Common in Southeast Asia and Europe.
5. Scallions: Grown in many regions, including Asia, Europe, and the Americas.

Benefits of Onion in Hair Serum

1. Hair Growth: Onion oil is rich in sulfur, which can help promote collagen production and improve hair growth.
2. Antifungal and Antibacterial Properties: Onions have antifungal and antibacterial properties, which can help control scalp infections and reduce dandruff.
3. Scalp Health: Onion oil can help soothe an itchy scalp and reduce inflammation.
4. Hair Strength: The sulfur content in onion oil can also help strengthen hair follicles and reduce breakage.
5. Dandruff Control: Onion oil's antifungal properties can help control dandruff and other scalp issues.

Fig- Onion



2 .HIBISCUS –[18,19,20]

Hibiscus powder can be used as a hair mask to nourish and strengthen hair. To make a paste, mix the powder with water or other ingredients such as coconut oil, yoghurt, or honey. The paste can then be applied to the scalp and hair and left on for 30 minutes to an hour before rinsing.

Hibiscus has been used for ages in Ayurveda to cure many ailments. The flowers of Hibiscus rosa- sinensis have been reported to possess wound healing, antibacterial and immunomodulatory properties. Several studies have proved the presence of anti-oxidant, anti-fungal and antimicrobial properties in flowers of Hibiscus rosa-sinensis [17]. Phytosterols, triterpenoids and flavanoids found in flower extract are advantageous forhair growth [18]. Hibiscus is used for rejuvenating the hair growth and for controlling dandruff [19]

Morphology

1. **Synonym:** Hibiscus mutabilis.
2. **Biological source** – The biological source of hibiscus is the plant Hibiscus rosa-sinensis,
3. **Family**: Malvaceae.
4. **Chemical Constituents:** anthocyanins and polyphenols.
5. **Geographical source** - Mauritius, Madagascar, Fiji, Hawaii, and India or China
6. **Here are some molecular aspects of hibiscus**:
   Chloroplast genome: The chloroplast genome of Hibiscus rosa-sinensis is 160,951 base pairs (bp) long and contains 130 genes. The genome is made up of two single copy regions, a large one and a small one,
7. **Use:** Anti-dandruff.
8. **Hibiscus can be beneficial for hair in many ways, including:**

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- **Hair growth**: Hibiscus contains nutrients and vitamins that strengthen hair follicles, stimulate blood circulation, and encourage new hair growth.
- **Hair repair**: Hibiscus can repair damage caused by environmental factors and styling.
- **Hair texture:** Hibiscus can improve the structure and thickness of hair strands. It can also reduce frizz and dryness, and prevent split ends.
- **Hair color:** Hibiscus can act as a natural dye to mask gray hair. Scalp health: Hibiscus can balance the pH value of the scalp and treat dandruff.

10 **.Hibiscus Types in Hair Serum**

- **Hibiscus Rosa-Sinensis (Chinese Hibiscus):** Rich in amino acids, vitamins, and minerals, this type of hibiscus is often used to promote hair growth, strengthen hair follicles, and improve hair texture.
- **Hibiscus Sabdariffa (Roselle):** Known for its antioxidant and anti-inflammatory properties, this type of hibiscus is often used to protect hair from environmental stressors, reduce dandruff, and soothe an itchy scalp.
- **Hibiscus Syriacus (Rose of Sharon):** This type of hibiscus is rich in flavonoids and phenolic acids, which can help to promote hair growth, improve hair elasticity, and reduce hair breakage.

Fig – Hibiscus



3 .Curry Leaves

Curry leaves are often used in hair serums and other hair products because they contain nutrients that can promote hair health: you've got dry hair with frizz and split-ends, using curry leaves will really help put that mane in place. A natural conditioner, the nutrients in curry leaves help nourish and moisturise each of the hair follicles and strands, resulting in less frizz and dryness

Morphology

1. **Synonym:** Murraya Koenigii.
2. **Family:** Rutaceae.
3. **Chemical Constituents**: linalol, elemol, geranyl acetate, myrcene, allo-ocimene.
4. **Use**: stimulate hair growth, antiox
5. **Geographical souce** : - india &uttar Pradesh
6. **Use** Curry Leaves in Hair Serum
    - **Infused Oil**: Infuse curry leaves in a carrier oil like coconut or olive oil to create a nourishing hair serum.
    - **Essential Oil**: Use curry leaf essential oil in a hair serum or mix it with other oils for a custom blend.
    - **Hair Mask**: Mix curry leaves with other ingredients like yogurt, honey, or olive oil to create a nourishing hair mask.

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Fig – Curry Leaves

4.Henna

The principle coloring compound of henna is "Lawsone," a red-orange colored compound present in a dried leaves in a concentration of 1-15% w/w. Lawsone is proposed to be used as a non-oxidizing hair coloring agent at a maximum concentration of 1.5% in the cosmetic product. Henna has also antifungal activity against Malassezia species (causative organism of dandruff).[13] The main uses of henna are as a cooling, astringent, anti-fungal and antibacterial herb for the skin and hair.[14,15] Henna balances the pHof the scalp for preventing premature hair fall and graying of hair.[16

Morphology

1. **Synonym**: bay, Lawsonia inermis.
2. **Biological source** - the leaves and stems of the henna tree, Lawsonia inermis L .
3. **Family:** Lythraceae.
4. **Chemical Constituents**: P-Coumaric acid, 2-methoxy-3-methyl-1,4-naphthoquinone andapiin.
5. **Geographical souce** of henna North Africa and the Middle East, and is also found in Asia and Australia
6. **Use**: Hair conditioning.
7. **How to Use Henna in Hair Serum**
    - **Infused Oil:** Infuse henna leaves in a carrier oil like coconut or olive oil to create a nourishing hair serum.
    - **Henna Powder**: Mix henna powder with a carrier oil or other natural ingredients to create a custom hair serum.
    - **Henna Extract:** Use henna extract in a hair serum or mix it with other oils for a custom blend.
8. The **molecular weight** of lawsone, the dye molecule in henna, is 174.15 grams per mole (g/mol):



Fig – Henna

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5.Vitamin E
Vitamin E is a naturally occurring compound found in various plant-based sources. Here are some of the top plant-based sources of vitamin E:

Plant-Based Sources of Vitamin E
1. Sunflower Seeds: Sunflower seeds are one of the richest sources of vitamin E.
2. Safflower Oil: Safflower oil is a good source of vitamin E and is often used in cooking and cosmetics.
3. Wheat Germ Oil: Wheat germ oil is a rich source of vitamin E and is often used in skincare products.
4. Almonds: Almonds are a good source of vitamin E and can be consumed as a snack or added to various recipes.
5. Spinach: Spinach is a leafy green vegetable that is rich in vitamin E and other antioxidants.
6. Pumpkin Seeds: Pumpkin seeds are a good source of vitamin E and can be consumed as a snack or added to various recipes.
7. Soybeans: Soybeans are a legume that is rich in vitamin E and is often used in food products and cosmetics.
8. Corn: Corn is a good source of vitamin E and is often used in cooking and cosmetics.

Vitamin E Content in Plants
Here's a rough estimate of the vitamin E content in some of the plants mentioned above:
- Sunflower seeds: 35.17 mg/100g
- Safflower oil: 34.13 mg/100g
- Wheat germ oil: 26.2 mg/100g
- Almonds: 7.39 mg/100g
- Spinach: 2.03 mg/100g
- Pumpkin seeds: 2.19 mg/100g
- Soybeans: 1.75 mg/100g
- Corn: 1.17 mg/100g

Here are the basic structure and chemical constituents of Vitamin E
Basic Structure of Vitamin E
Vitamin E is a fat-soluble vitamin that consists of a chromane ring with a hydroxyl group (-OH) attached to it. The chromane ring is fused to a phytyl side chain.

Chemical Constituents of Vitamin E
Vitamin E is a mixture of several related compounds, known as tocopherols and tocotrienols. The main chemical constituents of Vitamin E are:
1. α-Tocopherol: The most active and widely available form of Vitamin E.
2. β-Tocopherol: A less active form of Vitamin E, but still provides some antioxidant benefits.
3. γ-Tocopherol: A form of Vitamin E that has been shown to have anti-inflammatory properties.
4. δ-Tocopherol: A less common form of Vitamin E, but still provides some antioxidant benefits.
5. α-Tocotrienol: A form of Vitamin E that has been shown to have potent antioxidant and anti-inflammatory properties.
6. β-Tocotrienol: A less common form of Vitamin E, but still provides some antioxidant benefits.
7. γ-Tocotrienol: A form of Vitamin E that has been shown to have anti-inflammatory properties.
8. δ-Tocotrienol: A less common form of Vitamin E, but still provides some antioxidant benefits.

Chemical Formula of Vitamin E
The chemical formula for Vitamin E (α-Tocopherol) is:
$C_{29}H_{50}O_2$

Molecular Weight of Vitamin E
The molecular weight of Vitamin E (α-Tocopherol) is: 430.69 g/mol

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Fig – Vitamin E6

Castor Oil

Castor oil, also known as Ricinus communi Castor oil has a few other noteworthy effects in addition to being anti- inflammatory. "Increased gloss or shine of the hair shaft, and antimicrobial properties are some of the benefits of using castor oil".[20)

1. **Synonym:** Ricinus oil.
2. **Family:** Euphorbiaceae.
3. **Chemical Constituents**: Fatty acid and neutral lipids(triglycerides).
4. **Use**: Nourishing.

Benefit

Castor oil is a vegetable oil that can be used in hair serums to improve hair health and strength. It's rich in fatty acids and other nutrients that can help with a variety of hair concerns, including:



Fig – Caster Oil

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7.Almond Oil

Prunus amygdalus is an important nutritional source.It contains nutrition components like protein fat, carbohydrates,ash content, crude fiber, moisture content, vitamin E and also include mineral content like calcium,phosphorus,iron,potassium, etc.[21] The present study intended to use extracts of different herbs to formulate herbal hair serum for the improvement of hai

Morphology

1. **Synonym**: Prunus Amygdalus Dulcis.
2. **Family**: Rosaceae.
3. **Chemical Constituents**: oleic acid, linoleic acid, palmitic acid, palmitoleic acid.
4. Use: Anti-frizz.
5. **Benefit –**
    - **Hair loss:** Almond oil contains magnesium, which can help strengthen hair follicles and reduce hair loss. It also contains vitamin E, which can nourish and moisturize the scalp.
    - **Dry hair:** Almond oil's emollient properties can help condition dry hair.
    - **Frizzy hair:** Applying almond oil to the tips of your hair can help control frizz.
    - **Curly hair:** Almond oil can help detangle curly hair without causing breakage**.**
    - **Scalp conditions:** Almond oil's antimicrobial properties can help prevent dandruff and itchiness.



Fig – Almond Oil

- **Extraction Process –**



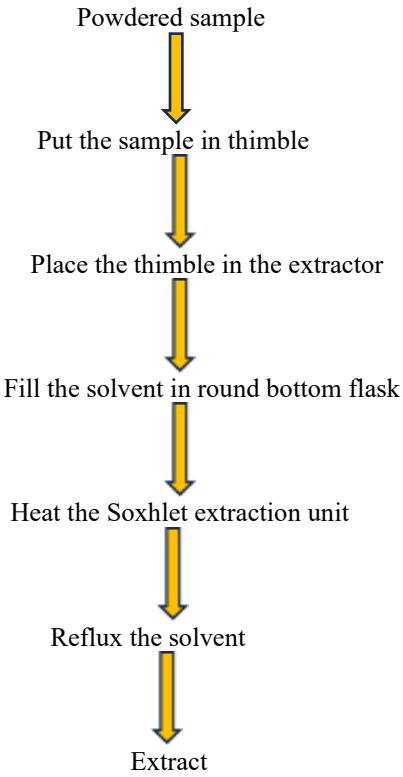
Fig 1- Soxhlet Apparatus

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Type of Extraction

1.Plant tissue homogenition
2.Serial exhaustive extraction
3.Soxhlet extraction
4.Maceration
5.Decoction
6.Infusion
7.Digestion
8.Percolation
9.Sonication

Process of Extraction :



Available marketed formulation –(Herbal Hair Serum)

1. Indulekha Bringha Hair Serum.
2. Mamaearth Onion Hair Serum.
3. Khadi Natural Herbal Hair Serum.
4. Forest Essentials Intensive Hair Serum.
5. Biotique Mountain Ebony Vitalizing Serum.
6. Wow Skin Science Red Onion Black Seed Oil Hair Serum.
7. Plum Olive & Macadamia Healthy Hydration Hair Serum.

CONCLUSIONS

Our research study completely focused on selections of pharmacologically potent herbal drug hair, such as antimicrobial, reduce hair loss, increased hair growth and follicles, reduce hair loss, prevent hair loss, and scalp damage.The aim and objective of present work was to formulation of herbal hair serum for treat several scalp and hair follicle related problems. It should be stimulate hair growth, hair follicle stimulations and it can able to act against bacterial and fungal related disease

Results have shown that herbal hair serum provides various essential nutrients needed to preserve the proper function of the sebaceous gland and support the growth of natural hair.

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