International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 2 Mar – Apr 2025, pp: 367-373 www.ijprajournal.com ISSN: 2456-4494

"Formulation and Evaluation of Herbal Hair Oil"

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Date of Submission: 10-03-2025 Date of Acceptance: 20-03-2025

ABSTRACT: Herbal formulations always have attracted considerable attention Because herbal formulations have virtually no side effects when compared to synthetic medications, they have consistently garnered significant attention. Cosmetics and the
idea of beauty are as old as humanity and civilization. Herbal formulations always have reduced or no adverse effects comparison with synthetic. The current study's goal is to prepare herbal hair oil with substances such as coconut oil, amla, neem, hibiscus, and onion. Based on the aforementioned facts, a boiling process was used to manufacture a mixture of crude pharmaceuticals in the form of herbal hair oil. We've used five distinct herbal medication formulations, and each one exhibits anti-hairfall properties along with a few additional advantageous properties like anti-dandruff activity, better blood circulation to the scalp, and roots, reduce hair pigmentation, anti-fungal activity, reducing the whitening of the hair. . In conclusion, the prepared herbal hair oil is utilized to promote hair growth, for supplementation of vitamins and minerals, preventing dandruff, split ends and alternative choice from hazardous chemicals.

KEYWORDS: Hair oil, Herbs, Formulation, Preparation, Amla, Neem, Hibiscus, Onion, Evaluation

I. INTRODUCTION

Cosmetics come in a variety of forms. The most popular types consist of materials that are applied, massaged, poured, or sprinkled onto different parts of the human body with the intention of cleansing, beautifying, or enhancing their appearance. The practice of creating herbal medicines has been documented for many years, originating in the Vedas and Unani texts, and has served as a medicinal modality throughout history.[1]

Hair plays a vital role in human existence. In India, there is a custom of blending various medications that promote hair growth with hair oils. Indian women are well-known for having long, shiny, and healthy hair, which is why hair care is a significant part of their self-care routines. The classic Ayurvedic text, the CharakaSamhitha, emphasizes the importance of oiling the scalp and hair to maintain healthy hair and prevent hair loss. It recommends oiling your hair daily with the appropriate herbs tailored to suit different hair types, and this practice continues to be followed to this day.[2]

The preparation of hair oil aims to treat issues such as split ends and dandruff. Its primary purpose is to cool the scalp, thereby promoting healthy hair growth for both men and women. Various oils, including castor, almond, coconut, and onion oils, are mixed with suitable herbal ingredients and applied directly to the scalp. Among these, coconut oil stands out as it penetrates hair strands more effectively and is more cost-efficient than other oils. Therefore, the best method for encouraging hair growth is to use coconut oil in combination with herbal remedies.[3]

Hair is a characteristic of mammals and serves various purposes, including protection against environmental elements like heat and cold. Along with sweat and sebaceous glands, hair is a vital component of the body. It is considered an accessory structure of the integumentary system and functions as a protective appendage.[4]

Cosmetics come in various forms and are primarily made from materials intended for application to different parts of the body. These products are used for purposes such as cleansing, beautifying, or enhancing one's appearance. Additionally, the creation of herbal remedies is a therapeutic practice that has been followed for centuries, with its origins found in the Vedas and Unani texts.[5]

Chemical medications can have undesirable side effects, which means they don't always deliver the intended results. Nowadays, there is a growing trend worldwide towards the use of herbal products in the cosmetics industry and beauty salons. Herbal cosmetics combine

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pharmaceuticals with bioactive ingredients to achieve the desired effects.[6]

In addition to containing phytochemicals and botanicals, herbal products also provide vitamins and minerals. Cosmetics serve to treat the body in two primary ways. Phytochemicals are natural substances that enhance the biological functions of the body.[7] A healthy body fosters healthy hair. Plants are utilized in herbal cosmetics in three primary ways: as total extracts, as single molecules obtained through extraction (such as onion extract, neem extract, hibiscus extract, and amla extract), and as natural molecules (for example, vitamins and coenzyme Q10). Hair is not only an important part of the body but also plays a significant role in influencing a person's appearance.[8]

There are a variety of hair care products available on the market today, designed to cleanse, reshape, transform, renew, replenish, and nourish hair. Herbal cosmetics are gaining popularity globally and are valued as a precious natural gift. These herbal cosmetic products come in a wide range of scents and colors, making them suitable for different beauty routines.[9] When used sparingly, herbal extracts can be incorporated into cosmetics without causing skin irritation. Herbal hair oils are popular for hair treatments for several reasons. They not only condition and repair dry scalp conditions but also moisturize the scalp to promote healthy hair growth. By ensuring that the sebaceous glands function properly, these oils supply a variety of essential nutrients to the scalp. These factors informed the design of the current study.[10]

Hair, along with sweat and sebaceous glands, is a vital component of the body, considered an accessory structure of the integument and serves as a protective appendage.[11] Hair's bulb, root, and shaft are its constituent parts.[12]

II. MATERIAL AND METHODS

A. Selected ingredients formulation of herbal hair oil :

1. Amla :

Synonym :

Emblica, Indian goose berry, Amla

Biological source :

This consists of dried, as well as fresh fruits of the plant EmblicaofficinalisGaerth (Phyllanthusemblica Linn.), belonging to family Euphorbiaceae.

Fig 1 : Amla

Chemical constituents :

It is highly nutritious and is an important dietary source of vitamin C, minerals, and amino acids. The edible fruit tissue contains protein concentration 3-fold and ascorbic acid concentration 160-fold compared to that of the apple. The fruit also contains considerably higher concentration of most minerals and amino acids than apples. The pulpy portion of fruit, dried and freed from the nuts contains: gallic acid 1.32%, tannin, sugar 36.10%; gum 13.75%; albumin 13.08%; crude cellulose 17.08%; mineral matter 4.12%; and moisture 3.83%. Tannins are the mixture of gallic acid, ellagic acid, and phyllembin.

Uses :

Amla oil benefits for hair along with Vitamin C, Amla is also a rich source of Vitamin E, which encourages good blood circulation, strengthening the hair roots. Amla also contains essential fatty acids that repair any cell damage in the scalp and promote healthy growth of follicles.

2. Coconut oil :

Synonym :

Coconut oil, coconut butter, copra oil

Biological source :

Coconut oil is the oil expressed from the dried solid part of endosperm of coconut, Cocosnucifera L., belonging to family Palmae.

Chemical constituents :

Coconut obtained from the hard, dried endocarp consists of a mixture of triglycerides of saturated fatty acids. The oil contains about 95% of saturated fatty acids with 8 and 10 carbon atoms. It shows the presence of caprylic acid, 2%; capric acid, 50–80%; lauric acid, 3%; and myristic acid about 1%.

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Fig 2 : Coconut oil

Uses :

Coconut oil is derived from milk of the coconut palm fruit. Coconut oil is used as A meals oil, and is used in industrial applications for cosmetics and detergent production. Coconut oil nourishes the scalp and proffer shine to the hairs. Also used as vehicle, promotes hair growth and Moistures the hair follicles.

3. Onion :

Synonym :

Janglipyaz, Sea onion, Urginea, Scilla

Biological source :

Urginea consists of dried slice of the bulbs of UrgineaindicaKunth, family Liliaceae.

Chemical constituents :

Indian squill contains about 0.3 per cent of cardiac glycosides. It yields to alcohol about 20 to 40 per cent of extractive. The other contents of the drug are mucilage (about 40 per cent) and calcium oxalate.

Fig 3 : Onion

Scillaren A and scillaren B are the major cardiac glycosides of the drug. Scillaren A on hydrolysis (by an enzyme) scillarenase yields proscillaridin A and on acid hydrolysis scillaridin A, whereas scillaren B yields proscillaridin B and scillaridin B respectively. The drug also contains glucoscillaren A and an enzyme scillarenase.

Uses :Onion plays a key role as a natural ingredient rich in sulfur, which helps to strengthen hair follicles, reduce hair breakage, and promote hair growth by improving scalp circulation and providing essential nutrients for healthy hair development.

4. Neem :

Synonym :

Margosa

Biological source :

It consists of all aerial parts of plant known as Azadirachtaindica, family Meliaceae.

Chemical constituents:

Good number of chemicals isolated from the plant belong to the classes diterpenes (sugiol), nimbiol (bark), triterpenes: ß-sitosterol, stigmasterol (leaf), Limonoids: Maliantriol (seed oil) nimbidinine (seed oil), Nimbendiol (seed oil) and azadiractin (seed), sulphurous compounds: Number of cyclic tri and tetrasulphides (leaves), flavonol glycosides: Nimaton, quercetin, myrecetin, kaempferol. Neem leaves contain not less than 1.0% w/w of Rutin.

Fig 4 : Neem

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Uses :

It has antimicrobial properties that can be used to ward off fungal and viral infections, and the oil works as an excellent repellent of head lice and for maintaining plant health. You can use neem oil to reduce dandruff and boost hair growth while reducing the chances of hair loss.

5. Hibiscus :

Synonym :

Cotton rose, roselle, hibiscus syriacus

Biological source :

The biological source of hibiscus is Hibiscus species, primarily Hibiscus rosa-sinensis (China rose) and Hibiscus sabdariffa (Roselle). These plants belong to the Malvaceae family.

Chemical constituents :

The preliminary phytochemical analysis showed that Hibiscus rosa-sinensis contained tannins, anthraquinones, quinines, phenols, flavanoides, alkaloids, terpenoids, saponins, cardiac glycosides, protein, free amino acids, carbohydrates, reducing sugars, mucilage, essential oils and steroids.

It has been also reported that it contains majorly cynidin-3,5-diglucoside, cynidin-3-sophoroside-5-glucoside, Anthocyanins and flavonoids, quercetin-3,7-diglucoside, quercetin-3-diglucoside. The other compounds are also present like cyaniding chloride, quercetin, hentriacontane, cyclopeptide alkaloid and vitamins: ascorbic acid and thiamine.

Uses :

Hair growth: Hibiscus can stimulate blood flow to the scalp, which can promote hair growth.

Fig 5 : Hibiscus

Hair loss: Hibiscus can nourish the scalp and strengthen hair roots, which can prevent hair loss.

B. Formula table :

Sr no.	Ingredients	Batch 1	Batch 2	Batch 3	Batch 4	Batch 5
1.	Amla	9ml	8ml	9ml	7ml	8ml
2.	Coconut oil	25ml	25ml	25ml	25ml	25ml
3.	Neem	4ml	7ml	5ml	6ml	6ml
4.	Onion	7ml	6ml	5ml	9ml	8ml
5.	Hibiscus	5ml	4ml	6ml	3ml	3ml

C. Method of preparation for herbal hair oil :

1.The parts of plants like Amla, Onion, Coconut oil, Neem and Hibiscus were collected from the local market.

2.Neem and Hibiscus (flower) are dried in sunlight, and converted into coarse powders.

3.The extracts were prepared by decoction method & the prepared extracts were stored in well- closed containers.

A. Extraction of onion :

Process :

- First took red onions and they grinded with the grinding machine.
- Then take the grinded onions in 500 ml of glass beaker and measured the weight of it with the help of weight machine.
- Then add some water in the beaker and mix the grinded onions with the water.
- Then let the mixture come to room temperature and then add chloroform liquid in that mixture and mix it well and let the mixture stay for 5 to 10 minutes. The oil is soluble chloroform so they mix to gather.
- After that we can see two layers of water and the chloroform so separate the chloroform with the help of separating funnel.
- After that we have to do water bath to get the oil.

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- For water bath take 1 aluminum vessel and fill the container with distilled water to the required level then turn on burner and control the temperature near 60 °C to 80 °C. and heat it till 2 to 3 hours until u see the yellow-colored dense liquid and no smell of chloroform.

- Or we can do steam distillation to evaporate the chloroform and get oil.

B. Extraction of Amla :
Process :

- The freshly collected leaves were thoroughly washed thrice in distilled water, shade dried, and powdered using a mechanical blender.
- The powdered drug was utilized for extraction. Material was passed through 120 meshes to remove fine powders and coarse powder was used for extraction. A method was used for extraction of powdered material.
- The powdered drug of amla (20g) and quantity of solvent of water (500ml) are kept for process.

C. Extraction of Neem :
Process :

- 100 g of neem powder was placed into the thimble and placed in the soxhlet chamber.500 ml of selected solvents (ethanol) were placed in a round bottom flask and assembled for the soxhlet extractor then the distillation process was begun. After completing the extraction process, the solvent and extractor were placed on a water bath to evaporate the solvent.

D. Extraction of Hibiscus :
Process :

- The Hibiscus flowers were washed, cut into small pieces, then put in the dryer for 48 hours at 45°C.
- The dried Hibiscus flowers are made into powder using a pollinator. Then the Hibiscus flower extract powder was macerated using 70% ethanol, stirred until homogeneous, and allowed to stand for 24 hours, then the extract was filtered through a Buchner filter funnel lined with filter paper to remove any impurities.
- The hibiscus flower pulp was mixed with ethanol, stirred and allowed to stand for 24 hours for the second filtration. The process of mixing the solution with ethanol was repeated once again and filtered. Then the filtrate was evaporated using an evaporator at a temperature of 700C. The filtrates then was diluted with distilled water until concentrations of 2%, 4%, and 6% were obtained.

4.Switch on the stove and let it boil. In between, mix it well and allow it to boil on a low flame.
5.Boiling takes 10 to 15 minutes. Boil until it gets a pale yellow.
6.Now, switch off the stove and allow it to cool down.
7.After that, filter it twice with the help of a clean cotton cloth.
8.To extract the oil completely, use a cotton cloth and transfer the mixture into it, then squeeze it.

III. EVALUATION PARAMETER :

3.1 Physical evaluation :

1. Colour :

- Detected by naked eyes.

2. Sensitivity :

- Applied to the skin and exposed to the sunlight for 5 min to check for any irritation over skin.

3. Grittiness :

- Rubbed to the skin and observed.

4. Sedimentation :

- Keep the whole preparation aside for overnight and check for sedimentation.

5. Specific gravity :

- Initially, empty specific gravity bottle was weighed. Then the same specific gravity bottle was filled with water and again weighed.
- Later specific gravity bottle was replaced with hair tonic and weighed again. Weights are noted and thus specific gravity of hair oil was calculated.

• Weight of empty specific gravity bottle = w1gms.
• Weight of specific gravity bottle with water = w2gms.
• Weight of specific gravity bottle with hair oil = W3gms.
• Specific gravity bottle of water = 0.9961 g/cm3.
• Specific gravity of hair oil was calculated as $\rho = W3-w1/w2-W1x\rho$

6. Ph :

- The pH was determined by using digital PH meter. 20ml of herbal hair oil was taken in a beaker and The bulb of PH meter was dipped

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in hair oil. The obtained pH values are noted down.

3.2 Chemical evaluation :

1. Acid value :

One gram of substance was dissolved accurately in 5ml of mixture of equal volume of ethanol and ether previously neutralized with 0.1M KOH. If the sample was not dissolved properly then reflux condenser was connected and the sample was warmed slowly with frequent stirring until the sample was dissolved. Then 1ml of Phenolphthalein solution was added and titrated with 0.1M KOH until the solution remained as faintly pink after shaking for 30 minutes. Acid Value was calculated from the following equation.

Acid value = n/w
Where, n=no. of ml of 0.1M KOH
W= Weight of substance

2. Saponification value :

2ml of herbal hair oil was weighed and transferred into a 25ml of conical flask. To this 25ml alcoholic KOH solutions was added. It was heated on a water bath for 30 minutes by frequently mixing the content of the flask phenolphthalein was added to cooled liquid and titrated against 0.5M HCL. Blank solution was performed and Saponification values were calculated.

Saponification value = (b-a)*28.05 / Weight of substance
Where, b = blank value
a = assay value

3. Viscosity :

The viscosity of prepared herbal hair oil was estimated by Ostwald's Viscometer at a room temperature. The viscosity of prepared herbal hair oil.

IV. RESULT AND DISCUSSION :

Physical evaluation :

Sr no.	Parameter	Observation
1.	Colour	Pale yellow
2.	Odour	Attribute
3.	Sensitivity	Non sensitive
4.	Grittiness	Smooth
5.	Sedimentation	No sedimentation
6.	Specific gravity	0.88
7.	pH	6.98

Chemical evaluation :

Sr no.	Parameter	Observation
1.	Acid value	6.2
2.	Saponification value	56.1
3.	Viscosity	0.96

Herbal hair oil is one of the most well-recognized hair treatments. Herbal hair oil not only moisturizes scalp but also reverses dry scalp and dry hair condition. It provides numerous essential nutrients required to maintain the normal function of sebaceous glands and promotes natural hair growth. The herbal hair oil was prepared from various parameters like sensitivity test, ph, irritation test, saponification value, and acid value of herbal hair oil.

V. CONCLUSION :

Herbal oil provides numerous essential nutrients required to maintain the normal function of sebaceous glands and promotes natural hair growth. All these drugs not only show remarkable activity but are also devoid of potential side effects as compared to synthetic drugs. So, this polyherbal hair oil has a cooling effect and thus relieves headaches and stress due to heavy workloads. It gets absorbed into the scalp within a shorter period of time and thus acts as nourishment to hairs.

It acts as a natural hair nourisher, helping in hair growth by the reduction of hair fall. Coconut oil moisturizes hair. Amla help in thickening and blackening of hair. Hibiscus helps in hair softening resulting in healthy growth. This hair oil also effectively used in treating headaches because of its cooling effects and thus relieves from stress and strain conditions. It has shown good hair growth results without any allergic or side effects as it is completely constituted with naturally occurring crude drugs. At last it can be concluded that, this herbal hair oil formulation has significant quality.

There are many hair treatments on the market today that contain herbal hair oils. In addition to moisturizing the scalp, herbal hair oils are also beneficial to reversing dry scalp and dry hair conditions. In addition to promoting natural hair growth, the product is packed with numerous essential nutrients. Herbal hair oil is made using several herbs , which have been discussed above as ingredients. Hence, it is concluded that the oil is beneficial in maintaining good growth of hairs, turning grey hairs to black, providing protection from dandruff & resulting in lustrous-looking hairs.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 2 Mar – Apr 2025, pp: 367-373 www.ijprajournal.com ISSN: 2456-4494

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