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Formulation and evaluation of hair fall control herbal hair oil

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Abstract

Clinical studies have demonstrated the benefits of herbs and herbal oil for hair growth. The primary issues linked to hair loss include dandruff, hair fading, and hair falling out, which are issues that both men and women find quite concerning. There are some synthetic medications for hair loss which exhibit serious adverse effects in addition to not providing an effective cure. The primary goal of this work is to create a herbal hair oil formulation that can address hair loss and other hair-related issues. Herbs like *Murraya koenigii*, *Lawsonia inermis*, *Azadirachta indica*, *Vitex negundo*, *Phyllanthus emblica*, *Centella asiatica*, *Hibiscus rosa sinensis*, Cedarwood oil and Rosmerry oil were selected for the formulations of hair fall control herbal hair oil.

Keywords: Herbs, hair growth, oil, formulation, evaluation, hair fall control

1. Introduction

Hair loss is a distressing situation for an increasing number of men and women both. It is great importance in develop new remedies for the treatment of loss of hair and other ailments, aggression of hair. They also promote hair growth^[1, 2]. Hair is one of the important parts of the body and is seen as a protective addition of the body and an auxiliary structure of the skin, along with sebaceous glands, sweat glands and nails. The basic parts of the hair are the earth (swelling of the base starting from the dermis), roots (this is the hair below the surface of the skin), shafts (this is the hair above the surface of the skin)^[3, 4]. We used vegetable hair oil for the hair treatment. Herbal hair oil not only moisturizes the scalp, but also restores dry scalp and dry hair. It provides many essential nutrients needed to maintain normal sebum function and promote natural hair growth^[5, 6].

2. Introduction about Herbs Used

2.1 Henna^[7-10]

- **Biological source:** Leaves of *Lawsonia inermis* L.
- **Family:** Lythraceae
- **Synonym:** Sepia, Auburn, Russet
- **Vernacular Name:** Henna
- **English Name:** Mehendi, Mendhi
- **Hindi Name:** Mehndi
- **Ayurvedic Name:** Mendhika, Madayanti
- **Sidhha/Tamil:** Alvanam, Aivani
- **Chemical Constituents:** 2-Hydroxy-1,4-naphthoquinone, 1,4-dihydroxy-naphthalene, 1,4-naphthoquinone, luteolins, apigenin, and their glycosides, fraxetin, scopletin, β -sitosterol, tannin, gallic acid, glucose, mannitol, fat, resin and mucilage.



Fig 1: Henna leaves

2.2.1 Uses

- It is used for the Growth of hair and hair fall control
- For coloring grey hair
- Treatment of epilepsy and Jaundice
- It is used as a remedy for malignant ulcers.
- In headache
- Antibacterial, Antifungal
- **Habitat:** North Africa, India, Sri Lanka, and the Middle East 10
- **Propagation:** By seeds
- **Useful Part:** Leave
- **Description:** It is a heavily branched, deciduous, bare, sometimes thorny shrub, or a small tree with a grayish-brown bark that reaches 2.45 m in height. It is cultivated throughout India as a hedge and is cultivated throughout India. **Leaves- size:** 1.3-3.2 by 0.6-1.6 cm

2.2 Nirgundi ^[11]

- **Biological source:** It is obtained from leaves of *Vitex negundo*
- **Family:** Verbenaceae
- **Synonyms:** Sinduvara, Sephali
- **Vernacular Name:** Five-Leaved Chaste Tree,
- **English Name:** Chinese chaste tree, five-leaved, chaste tree, Indian privet
- **Hindi Name:** Bheudi, Mewri, Nengar, Ningori, Nigandi, Nirgandi
- **Ayurvedic Name:** Sinduka, Nisinda,
- **Unani:** Nisinda
- **Sidhha/Tamil:** Venmochi, Notchi, Nirnoch.
- **Chemical constituents:** Casticin, Isoorientin, Chrysophenol D, Luteolin, P-hydroxyl benzoic acid and D-fructose.
- **Uses:** It helps prevent grey hair. It lowers high body temperature, fights infections, and strengthens immunity due to its high vitamin C content and natural antibiotic properties. Chaste tree leaves are boiled in water, filtered and removed, and immediately consumed to relieve heat.
- **Habitat:** Central India
- **Propagation:** Stem Cutting
- **Useful Part:** Leave
- **Description:** In India, Nirgundi is Ayurveda, folk, Siddha, Tibetan, Unani system Medicine (Udayan and Indirabara Chandran, 2009; Vishwanathan and Basavaraju, 2010). It's interesting that this isn't done either with homeopathy and allopathic system

medicine. Has innumerable medicinal properties Due to Vitex, the plant also has widely used in the treatment of. Already used Lots of complaints.



Fig 2: Nirgundi leaves

2.3 Amla ^[12-16]

- **Biological source:** Dried fruits of *Phyllanthus emblica*
- **Family:** Phyllanthaceae
- **Synonyms:** Emblica, Indian goose berry, Amla.
- **Vernacular Name:** Amla
- **English Name:** Emblica myroblan
- **Hindi Name:** Amla
- **Ayurvedic Name:** Dhatriphala, Amla, Amalaki, Amalakan, Sripalam, Vayastha
- **Unani:** Aaonwala, Amlaj
- **Sidhha/Tamil:** Nellikai
- **Chemical Constituents:** Fruits contain about 28% of the tannins in the whole plant. This tannin has two hydrolyzable forms. (I) Embricanin A and (ii) Embricanin B are naturally antioxidants. Embricanin A provides ellagic acid, glucose and gallic acid when hydrolyzed, whereas embricanin B is hydrolyzed to form ellagic acid and glucose. This fruit is also a source of fillembrin. Further fractionation revealed the presence of many other phytochemicals. H. Geraniin, corilagin, gallic acid, frosin.



Fig 3: Amla fruit

- **Uses:** Promote healthy hair growth, Boost volume, reduce dandruff, Treat head lice.
- **Habitat:** Uttar Pradesh Tamil Nadu, Rajasthan and Madhya Pradesh in India
- **Propagation:** Propagated by Shield budding
- **Useful Part:** Fruit, seeds, leaves, root, bark
- **Description:** Amla tree height grows up to 8 meter,

Branchlets 10-20 cm long. Amla Leaves have pinnate resemblance, very tiny, simple and attached by the base to branchlets. Colors of flowers are yellowish.

2.4 Brahmi ^[17, 18]

- **Biological source:** Leaves of *Centella asiatica*
- **Family:** Apiaceae
- **Synonyms:** *Hydrocotyle asiatica*
- **Vernacular Name:** Brahmi
- **English Name:** Asiatic Pennywort
- **Hindi Name:** Bemsgag, Brahma-Manduki, Gotukola, Khulakhudi, Mandookaparni
- **Ayurvedic Name:** Mandukaparni
- **Unani:** Khulakudi
- **Sidhha/Tamil:** Babassa, Vallarai
- **Chemical Constituents:** Triterpenoids, Volatile and Fatty acids, Alkaloids, Glycosides, Flavanoids, Others-Vitamin B, C, G and some amino acids et
- **Use:** This herb helps in forming a protective layer around the hair fibres.
- **Habitat:** India, China and Indonesia
- **Propagation:** Rooted sucker and seed
- **Useful Part:** Leaf



Fig 4: Brahmi leaf

- **Description:** *Centella asiatica* is known primarily as "brain food" in India because it is one of the leading herbs used to treat hair losses, skin problems, heal wounds, and activate nerves and brain cells. The leaves, 1-3 from each node of stems, long petioled, 2-6cm long and 1.5-5cm wide.

2.5 Hibiscus ^[19-21]

- **Biological source:** Dried flowers of *Hibiscus Rosasinesis*
- **Family:** Malvaceae
- **Synonyms:** Rosids, Malvales
- **Vernacular Name:** Chinese Rose
- **English Name:** Rosemallow
- **Hindi Name:** Gudhal
- **Ayurvedic Name:** Japapushpa
- **Unani:** Gurhal, Gudhal.
- **Sidhha/Tamil:** Semparuthi
- **Chemical Constituents:** Alkaloids, L-ascorbic acid, Anthocyanin, Beta-carotene, Beta-sitosterol, Citric acid,

Polysaccharides etc.

- **Uses:** Stop hair loss, make your hair look healthy and lustrous, prevent premature graying, thicken hair and add volume, treat dandruff, Condition against frizz, Dryness, and breakage, Prevent split ends.
- **Habitat:** U.S, Europe, India
- **Propagation:** Stem Cutting
- **Useful Part:** Flower



Fig 5: Hibiscus flower

- **Description:** The leaves are alternate, ovate to lanceolate, often with a toothed or lobed margin (dentate). The flowers are large, conspicuous, trumpet-shaped, with five or more petals, color from white to pink, red, blue, orange, peach, yellow or purple, and from 4–18 cm broad. Flower colour in certain species, such as *H. mutabilis* and *H. tiliaceus*, changes with age. The fruit is a dry five-lobed capsule, containing several seeds in each lobe, which are released when the capsule dehisces (splits open) at maturity. It is of red and white colours. It is an example of complete flowers.

2.6 Neem ^[22, 23]

- **Biological Source:** Leaves of *Azadirachta indica*
- **Family:** Meliaceae
- **Synonyms:** Neem tree, Nim tree, Margosa, Arisrth
- **Vernacular Name:** Nim tree or Indian lilac
- **English Name:** Neem tree, Bastard tree, Indian lilac
- **Hindi Name:** Balnimb, Neem, Nim, Nimb, Veppam
- **Ayurvedic Name:** Arista, Nimbah, Picumarda
- **Sidhha/Tamil:** Vepa, Veppu, Vembu
- **Chemical Constituents:** The most important active constituent is azadirachtin and the others are nimbolinin, nimbin, nimbidin, nimbidol, sodium nimbinat, gedunin, salannin, and quercetin.
- **Uses:** Condition your scalp, promote healthy hair growth, temporarily seal hair follicles, soothe frizz, minimize grays, reduce dandruff, Treat head lice.
- **Habitat:** India, Pakistan, Bangladesh
- **Propagation:** By neem seed germination, but you can also root shoot and root cuttings.
- **Useful Part:** Leaf



Fig 6: Neem leaves

2.6.1 Description: It is evergreen tree with a height of 15 m (30 m maximum), having a large rounded crown (10–20 m) with spreading branches and a branchless bole (7.5 m, diameter 90 cm). The bark of the tree is thick, fissured, dark gray to red (inside) in color, and it possesses a gummy colorless sap. The leaves are long (20–40 cm), alternate, pinnate, exstipulate, and glabrous with a light green hue. The leaves have two pairs of basal glands with a subglabrous petiole (2–7 cm) and above, channeled rachis. Each leaf comprises 8–19 serrated, proximally alternate, ovate to lanceolate leaflets.



Fig 7: Curry leaves

2.7 Curry Leaves ^[24]

- **Biological Source:** It is the dried leaves of *Murraya koenigii*
- **Family:** Rutaceae
- **Synonyms:** Mitholimdo
- **Vernacular Name:** Curry Leaf Tree, Daun Kari, Indian Curry Tree
- **English Name:** Curry leaves
- **Hindi Name:** Curry patta, Meetha Neem, Kathnim
- **Ayurvedic Name:** Girinimba, Suravi
- **Sidhha/Tamil:** Karivempu, Karuveppilei, Karivepila
- **Chemical Constituents:** Volatile oil, the major constituents identified were alpha-pinene (51.7%), sabinene (10.5%), beta-pinene (9.8%), beta-caryophyllene (5.5%), limonene (5.4%), bornyl acetate (1.8%), terpinen-4-ol (1.3%), gamma-terpinene (1.2%) and alpha-humulene (1.2%). (5)
- **Uses:** Prevents hair fall and premature greying of hair, Leprosy, eye problem, epistaxis, intestinal worms, anorexia, biliousness, skin ulcers.
- **Habitat:** Pakistan, Sri Lanka and India east to China and Hainan
- **Propagation:** Cuttings or seed
- **Useful Part:** Leaf

- **Description:** *Murraya koenigii* is an unarmed, semi deciduous aromatic shrub or small tree with slender but strong woody stem and branches covered with dark grey bark, leaves are imparipinnate, glabrous, and very strongly aromatic. Leaflets 9-25 or more, short stalked,

alternate, gland dotted and strongly aromatic. The stem of *Murraya koenigii* is an aromatic and more or less deciduous shrub or small tree up to 7 meters in height and 14 to 42 cm in diameter.



Almond oil



Coconut oil



Castor oil



Cederwood oil



Rosemary oil



Lemon oil

2.7 Formulation literature Review

Herbal hair oil was prepared with the help of Amla, Hibiscus, Brahmi and Methi. They have evaluated parameters like specific gravity, pH, Refractive Index & Acid Value. The Result was found to be excellent hair growth activity [25-28].

Herbal hair oil Prepared to evaluating hair growth activity with help of Embilica, Bacopa & more. They Evaluate parameters like pH, Saponification Value, Physical taste and the results were found to be Various 3 Formulation Showed good and satisfied result for hair initiation and hair growth activity and also improvement in length of hair & its diameter [29, 30].

Herbal hair oil prepared by using herbal ingredients like, Amla, Nirgundi, Jatamansi, Neem. They evaluated by various parameters likes, pH, acid value. The Result were found to be herbal hair oil not only moisture scalp but also reverse dry scalp & dry hair condition [31].

Sometime hair oil prepared poly herbal hair oil by using leech, hibiscus, onion, bee live, coconut oil like herbs and the result were found to be the presence of natural ingredients, this formulation proves to be a boon to fight the trending problems of hair fall due to various response [32].

Few parameters were developed & evaluated of poly herbal antidandruff hair oil by using various herbs like eucalypts oil, ocimum oil, Hibiscus, Amla and tridax result found to be excellent hair growth stimulation [33-35]. Polyherbal Hair oil was prepared by using different herbs like, curry leaves, Banyan, Eclipta, Amla, Henna, Hibiscus, Vetives, Fenugreek and coconut oil and result was found to be

maintaining good hair growth [36].

3. Materials and Methods

3.1 Collection of plant materials

The herbal hair oil was prepared by collecting various plant materials like the fresh leaves of Curry, Henna, Neem, Nirgundi, Brahmi and Hibiscus flower from the garden, Rajkot and purchase Cedarwood oil and Rosemerry oil from Dhanvantri Ayurvedic shop, Rajkot, Gujrat. It was identified by Local Botanist working as an assistant. A voucher specimen of all has been kept in our laboratory for future reference. The leaves were shade dried, powdered and sieved through 40 meshes, and then stored in a tightly closed container for further use. Coconut oil in the mixture was used as ideal base oil and Castor oil, Almond oil were also used in mixture. The lemon oil was used to reduces dandruff. The oil works well as a hair tonic and can make your hair shinier and much stronger. The citric acid present in lemon oil prevents the hair follicles from getting loose, thus reducing hair fall.

3.2 Preparation of herbal hair oil

Accurately weighed all the dried and fresh herbs and leaves powder was taken. Coconut oil, castor oil, Cedarwood oil, Rosmery oil and almond oil were mixed. After that add henna powder, Amla powder were added and kept aside for overnight. Then curry leaves, neem powder were added and boiled until colour changes to dark brown colour. Small amount of flavoring agent (lemon oil) was added to the oil and after whole preparation was filtered through muslin cloth and filter paper. It was stored in tightly closed bottle.

Table 1: Formulation of herbal hair oil

Sr. No.	Ingredients	Quantity (for 180 ml oil)
1.	<i>Azadirachta indica</i> J. Juss (Neem)	4.5 g
2.	<i>Murraya koenigii</i> (Curry leaves)	4.5 g
3.	<i>Phyllanthus emblica</i> Linn. (Amla)	9 g
4.	<i>Lawsonia inermis</i> (Henna)	3.6 g
5.	<i>vitex negundo</i> (Nirgundi)	3.6 g
6.	<i>Centella asiatica</i> L. (Brahmi)	12.9 g
7.	<i>Hibiscus rosasinensis</i> (Hibiscus)	18 g
8.	Cedarwood oil	9 ml
9.	Rosemerry oil	9 ml
10.	Almond oil	3.6 ml
11.	Coconut oil	64.8 ml
12.	Castor oil	18 ml
13.	Lemon oil	19.8 ml

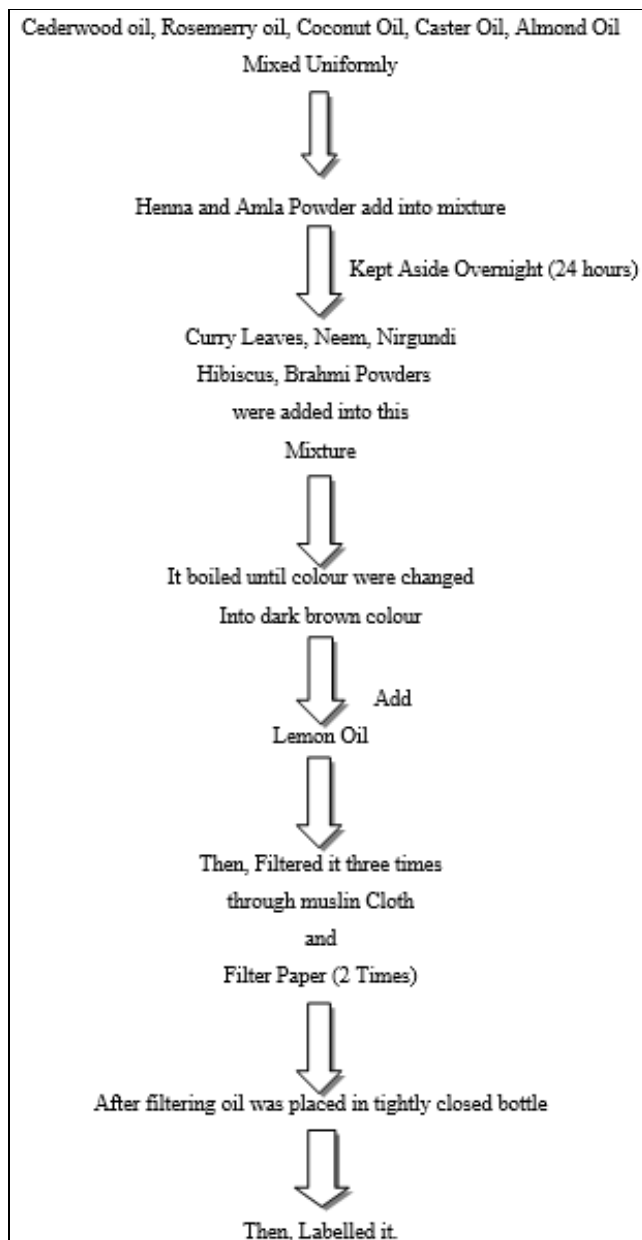


Fig 8: Chart of Herbal Hair Oil preparation

3.3 Evaluation of Herbal Hair Oil

- The formulated herbal oil was evaluated for parameters like pH, acid value, saponification value, refractive index, viscosity and organoleptic parameters. ⁽³⁸⁻⁴¹⁾

3.3.1 Saponification value

- 2g of oil was accurately weighed and transferred into a 250ml of iodine flask. 25ml of 0.5M alcoholic potassium hydroxide was added and boiled under reflux on a water bath for 30mins. Phenolphthalein was added as indicator and titrated against 0.5M HCl ('a' ml). Similarly blank was performed ('b' ml) without the sample. The result was taken in triplicate.
- Saponification Value: $28.05(b-a)/w$ Where,
- w= weight in grams of the solution.

3.3.2 pH

- pH of the herbal oil was detected using pH strip.

3.3.3 Viscosity

- Viscosity was determined using Ostwald's viscometer.

- The result was taken in triplicate.

3.3.4 Specific gravity ^[43-45]

- Specific gravity of the prepared oil was determined using specific gravity bottle. The result was taken in triplicate.
- The specific gravity of the solid is the ratio of its weight in air to the difference between its weight in air and its weight immersed in water. Two methods are commonly used for determining the specific gravities of liquids.

3.3.5 Refractive index ^[45-50]

- It was determined using refractometer.
1. Place the instrument in front of sodium light source or ordinary light source for measuring refractive index or brix reading of sample.
 2. Look into eye piece (1) Focus into the eye piece upward and down ward, similarity focuses the scale eye piece (2).
 3. Adjust reflector to get desired light, now rotate the scale knob (5) and look into the eye piece (2) and consider

zero with the line. Now instrument is ready for testing the samples. For reading the samples on a specific temperature. Fit the thermometer at space (7) by screw cap, then attach rubber tube at inlet tap (9) then supply hot or cold water through water bath and take reading. Use dropper for thin solutions.

4. Use brush or glass rod for thick solutions.
5. Use dropper to place the sample material in inlet hole.

3.3.6 Organoleptic property

- Colour and Odour was determined manually.

3.3.7 Irritation test

- Oil was applied on hand and exposed to sunlight for 5mins to check for any irritation over skin.

4. Results

The prepared herbal hair oil using the above-mentioned ingredients was evaluated for the following parameters and the results are tabulated [Table: 2]

Table 2: Result of Herbal Hair Oil

Sr. No.	Parameters	Observation
1.	Color	Greenish Brown
2.	Odour	Lemon Characteristic
3.	Specific gravity	± 1.066
4.	pH	± 6
5.	Saponification value	± 52.45
6.	Irritancy test	No Irritation
7.	Refractive Index	± 3.51
8.	Viscosity	± 0.94

Values are expressed as mean \pm standard deviation

5. Conclusion

All the parameters showed that they are within the limits and as per the standards. Since all the ingredients added have many advantages, this oil will help in maintaining good growth of hair by Promoting hair growth, turning grey hair to black, Hair fall, protects from dandruff, provide shining, results in lustrous looking hair, Treating dry scalp, Increasing scalp blood circulation, Treating folliculitis and scalp acne, Treating head lice, Eliminating scalp odor, Treating fungal infections and dandruff.

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