



Formulation and Evaluation of Herbal Hair Oil with special reference to *Nyctanthes arbor tristis*

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Abstract

A formulation known as herbal hair oil is made up of natural substances, including the base that stimulates hair growth. An effort was undertaken to create a herbal product without the use of any synthetic ingredients, in which the formulation itself gave the look of the hair oil, including colour and scent. On the basis of their traditional uses and their accessibility in commercially available herbal preparations, various components were included. Harsingar oil benefits start with the fact that these two conditions are known to be cleared up and controlled by this oil. It is used as a hair tonic to thicken hair and stop it from falling out. It is used to grow hair longer and healthier because it is believed to nourish hair. The goal of the current study was to create herbal hair oil for general use (application in hairs). The developed herbal hair oil was assessed, and a number of factors including the sensitivity test, acid value, saponification value, pH, etc. were identified and reported in this work.

Keywords: Cosmetics, Herbs, Herbal hair oil, *Nyctanthus arbor tristis*, Hair tonic, Evaluation

Introduction

Cosmetics are substances used to enhance the appearance or odor of the human body. Cosmetics include skin-care creams, lotions, powders, perfumes, lipsticks, fingernail and toe nail polish, eye and facial makeup, permanent waves, colored contact lenses, hair colors, hair sprays and gels, deodorants, baby products, bath oils, bubble baths, bath salts, butters and many other types of products. A subset of cosmetics is called "make-up," which refers primarily to colored products intended to alter the user's appearance. Many manufacturers distinguish between decorative

cosmetics and care cosmetics^[1]. In the last three-four decades the use of cosmetics has increased exponentially not only among females but the male population also indulges in their use. Hair dyes, hair oil, creams are as popular with males as with females. Most countries now have laws to control, manufacturing, label, sale etc. of cosmetics in such a way that use of cosmetics harmful to health is prevented^[7]. The concept of beauty and cosmetics is as ancient as mankind and civilization. So, they use various beauty products that have herbs to look charming and

young. Indian herbs 350 S. Gautam et al.: Formulation and Evaluation of and its significance are popular worldwide. Herbal cosmetics have growing demand in the world market and are an invaluable gift of nature. There are a wide range of herbal cosmetic products to satisfy beauty regime. Adding herbs in cosmetics is very safe for our skin 3-5. Herbal hair oils are 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 normal functions of sebaceous gland and promote natural hair growth. Keeping this point in consideration the present work was undertaken. Hair plays an important role in human life [8]. In India the traditional process is the preparation of hair oils put together with various hair growth promoting drugs. Indian women are known for their long, shiny and healthy hair, so it is not surprising that hair care features prominently in their self-care rituals preparation of hair oils put together with various hair growth promoting drugs. The Charaka Samhitha (the definitive book on Ayurvedic medicine) describes the importance of oiling the hair and scalp to maintain good hair health and prevent hair loss. The daily hair oiling was recommended with appropriate herbs filled to suit others constituents and this practice also continuous until today [9]. The hair oil preparations are included to treat various dandruff, hair fall process, split ends etc. The hair oil preparations are mainly used to cool the scalp for luxurious growth of hair in both men and women. Various types of oils like coconut oil, almond oil, castor oil, onion oil are applied to scalp in admixture with suitable herbal drugs.

Among these oils coconut oil is the foremost worthy oil base because it get absorbed into the hair strands better than other oils and also economical compared to other oils. Hence coconut oil added with herbal drugs is mentioned method for best hair growth [10]. Hair on our head is the first line defense against the sun's UV rays. Hair care products are nothing but it is those formulations which are used for modifying the texture of hair. Herbal cosmetic are highly used due to their less adverse effects and the ingredients used are easily available. Now a day's hair care cosmetic are added with herbs and they are well recognized compared with synthetic ones. These years, a part of the hair care routine the use of hair oils has been increasing and it is due to their benefits in addressing the hair concerns. Hair oils are formulated with both synthetic and natural ingredients [11]. Synthetic hair oils are those hair care products which are made by chemical or artificial substances. They are used to provide shine and excellent conditioning and they also helps to reduce frizz. Natural hair oils are the hair care products which are rich in Vitamins, Minerals and Fatty acids which are the vital elements in the human cells and these elements are also present in the skin and hair of our body. Hence, while we are applying the natural hair oils, we are allowing these vital nutrients to absorb well into the scalp and hair thus it helps for a healthy regeneration of the scalp and a strong and healthy hair growth. Apart from hydrating your scalp and stimulating hair growth, hair oiling also strengthens the hair.

Harsingar plant: Harsingar plant is also known as Night Jasmine or Parijat. It is loaded with beneficial qualities and is native

to Southeast Asia and South Asia. It is a small tree or a shrub growing up to 33 feet tall with a grey flaky bark. The leaves are quite broad with a margin. The flowers look breathtaking with 5 to 8 white corolla petals, having an orangish-red centre. The fruit which this flower bears is a brown round to heart shaped capsule of 2 cm diameter containing a single seed. This flower is found in abundance in West Bengal, India and also in Kanchanaburi Province in Thailand. ^[4] This flower loses its brightness during daytime and is most commonly used as a yellow dye for clothing. Cultivation: Harsinger usually grows in

tropical regions of the world. Though this plant usually blooms at night, it does require plenty of sunlight and it cannot survive in a frosty or cold area. It grows best in sandy soil, moist and well drained soil. It cannot grow in highly saline soil. It is usually found in some regions of South Asia and Asia. The botanical name of the Harshingar (Parijat) Oil is *Nyctanthes arbor-tristis* and extracted from the Leaves by the process of Steam Distillation method. The other names of Harshingar (Parijat) oil are Night-Flowering Jasmine, Parijat and Coral Jasmine. We use Amber Color Glass Bottle for storage ^{[2][3]}



Figure No. 1: Nyctanthus arbor tristis

Ideal properties:

1. Herbal hair oil is one of the most well recognized hair treatments
2. Herbal hair oil not only moisturizes scalp but also reverses dry scalp and dry hair condition

3. It provides numerous essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. ^[6]

Table No. 1: Role of herbs in Herbal hair oil

Sr. No.	Ingredients	Importance
1	Harsingar	Hair tonic , Hair strengthening, Antidandruff
2.	Amla	Hair growth
3	Neem	Antimicrobial
4	Shatavari	Hair growth
5	Shankpuspi	Nervine tonic
5.	Brahmi	Nervine tonic
6.	Kapur	Stimulating agent
8.	Pudina	Flavouring agent
9.	Til oil	Vehicle
10.	Castor oil	Vehicle
11.	Coconut oil	To make up the volume
12.	Lavender oil	Perfuming agent

Table No. 2: Ingredients used in Herbal Hair oil.

Sr.no	Ingredients used in formulation of herbal hair oil	Ingredients Quantity[%]
1.	Harsingar oil	13.5%
2.	Amla	6.6%
3.	Shatavari	3.33%
4.	Brahmni.	5.3 %
5.	Shankpushpi	3.3%
6.	Neem.	5.3%
7.	Pudina.	6.6%
8.	Kapur	0.3 %
9.	Til oil	33.3%
10.	Castor oil.	33.3%
11.	Coconut oil	q.s.
12.	Lavender oil.	Few drops

Detailed Description about the Ingredients Used

1. Harsingar

Common name: - Night blooming - Flowering jasmine, Harsingar.

Botanical name: *Nyctanthes arbor tristis*

Family: - Oleaceae

Chemical constituents: - The leaf of Harsingar contains benzoic acid, fructose, glucose, carotene, amorphous resin, ascorbic acid, methyl salicylate, tannic acid, oleanolic acid and flavanol glycosides.

Uses:

- Works as a hair tonic
- Used to strengthen the hairs

- Prevent hair fall.
 - Prevent greying of hairs and other scalp related problems.
- Controls dandruff and hair lice.



Figure No. 2:-Harsingar leaves

2. Amla

Common name: Myrobalan, Aamlaki

Biological source: It consist of dried as well as fresh fruit of the paint *Emblica officinalls* Gaerth.

Family: Euphorbiaceous

Chemical Constituents: Vitamin C and Tannin, Calcium, Iron

Uses: Hair growth activity [5].



Figure No. 3: Amla Powder

3. Shatavari

Common name: Vari, indivari, shatamuli

Biological source: It consists of dried root and leaves of plant known *Asparagus racemosus*.

Family: Liliaceae.

Uses: Nervine disorder ^[5]

Chemical constituent: Shatavari I to IV 0.2%,
Sarsapojenin.



Figure No. 4:- Shatavari

4. Shankpuspi

Common name: Shakhava, Manglay and
Kusuma

Biological source: It consists of dried root and
leaves of plant known Asparagus racemosus.

Family: Liliaceae

Chemical constituent: Shatavarin I to IV
0.2%, Sarsapojenin

Uses: Nervine disorder ^[5].



Figure No. 5:- Shankpuspi

5. Brahmi

Common name: Kapotvadka, Somvalli,
Saraswati

Biological source: Bramhi consist of the fresh
and dried leave and stem of Centella asiatica.

Family: Umbelliferae

Chemical constituent: Saponin glycoside-
Brahmoside, Triterpane acid - Brahmic acid,
Tannins, flavonoids.

Uses: Nervine tonic ^[5].



Figure No. 6: Brahmi

6. Kapur

Common name: Kapur

Biological source: It occur in all part of the Comphor tree, *Cinnamomum camphora*.

Family: Lauraceae

Chemical constituent: Volatile compound, 1,3- Cineole, 4.3% α -terpineol.

Uses: Pain relive and Reduce Itching [5].



Figure No. 7:- Kapur

7. Pudina

Common Name: mint, mentha

Biological source: Pudina consists of fresh leaves of *Mentha spicata* Linn.

Family: Labiatae

Chemical constituents: Menthol (40.7%), Menthone (23.4%), menthyle acetate, 1, 8- cineole, limonene, beta-pinene and beta-caryophyllene.

Uses:-As Flavouring agent



Figure No. 8: Pudina

8. Til Oil

Common name: Sesame oil

Biological source: It is fixed oil obtained by expression from the seed of *Sesamum indicum* l

Family: Pedaliaceae

Chemical constituent:

Lipid-45-60% Fixed oil, Vitamin A and E.

Uses: Nutritive, hair growth and maintain scalp health [5]



Figure No. 9:-Til Oil

9. Neem

Common name:-Neem

Biological source: Neem consists of the fresh or dried leave and seed oil of *Azadirachata indica*.

Family: Meliaceae

Chemical constituent: Nimbiol, Flavalol, Glycoside

Uses: Stimulant and anti-microbial [5]



Figure No. 10:- Neem

10. Coconut Oil

Common name: *Cocos nucifera*

Biological source: -Coconut the expressed him the dried slid part of endige fout.

Family: Arecaceace

Chemical constituents: coconut oil is composed of the fatty acids, caprylic acid C-

capric acid, lauric acid, myristic acid, palmitic acid, stearic acid and 2% of Linoleic acid.

Uses: In addition to being good for your scalp, coconut oil also moisturizes your hair, since it's easily absorbed; it works better than other oils at repairing dry hair



Figure No. 11:- Coconut oil

11. Castor Oil

Common name: *Ricinus oil*

Biological source: *Oleum Ricini* Fixed oil obtained by the cold expression of the seeds of *Ricinus communis*

Family: Euphorbiaceace

Chemical constituents: Ricinoleic acid, stearic, palmitic, linoleic, linolenic acid.

Uses: - Castor oil is a natural conditioner that keeps your hair healthy, shiny, and soft.



Figure No. 12:- Castor oil

Formulation of herbal hair oil

i] Extraction of oil from Harsingar through clavenger apparatus

Procedure

1. We have taken 200g of freshly crushed harsingar leaves with 300ml of water in round bottom flask, then added a few pieces of porcelain to it (to avoid bumping during distillation).
2. After that we had set up the apparatus as represented in the picture.
3. Whole assembly was settled down on heating mantle.
4. Clavenger apparatus was attached to round bottom flask then the condenser attached to the mouth of clavenger apparatus to hold up assembly was tied with the stand.
5. The rubber tube were attached to the inlet and outlet of the condenser, the inlet rubber tube one end is attached to the tap water and the another end is attached to the condenser.
6. Switch on the heating mantle and rise the temperature of heating mantle at 80⁰C .
7. Time were noted when layer was formed in clevenger during extraction.
8. Two layers (aqueous and oil rich) were obtained and oil was further separated.
9. Firstly the water layer was removed and then oil layer was collected and preserved for further use.
10. Then the cycle was repeated upto, we get required amount of oil.



Figure No.13:-Clavenger assembly



Figure No.14: Aqueous & oil extract



Figure No. 15:- Harsingar extract

ii] Preparation of Herbal Hair oil

Accurately weigh all the dried and fresh herbs such as Amla, Shatavari, Neem, Shankpusphi, Brahmi, Kapur and Pudina and were grinded in the mixture and was mixed in til oil and Castor oil. The above content was boiled for

20 min. and was filtered through muslin cloth. And add Harsingar leaves oil to the filtrate and coconut oil was added to make up the volume. Finally small amount of flavouring agent was added to the oil and it was placed in amber colored bottle.



Figure No.16:- Heating on water bath



Figure No. 17:- Extracted oil



Figure No. 18:- Filtration using muslin cloth



Figure No. 19:- Filtered oil



Figure No. 20:- Formulated oil

Evaluation of herbal hair oil

The formulated herbal hair oil was subjected to physical and biological evaluation

- Appearance of herbal hair oil :-

- Colour: Dark green , Odour : Lavendar , Coconut

The prepared herbal hair oil was applied on 1 cm skin of hand and exposed to sunlight for 4min. ^[1]

Sensitivity test



Figure No. 21:- Sensitivity test

Observation: No irritation found.

1. Acid value

Preparation of 0.1 molar solutions: Weighed 0.56 g KOH pellets and dissolved in 100 mL of distilled water and stirred continuously. The prepared 0.1 molar KOH solution was

filled in the burette. Preparation of sample: Measured 10 mL oil and dissolved in 25 mL of ethanol and 25 mL of ether mixture and shaken. Added 1 mL of phenolphthalein solution and titrated with 0.1 molar KOH solution

Observation Table

Sr. no	Burette reading		Volume of 0.1 N KOH solution used in ml (F-I)	End result
	Initial (I)	Final (F)		
1.	0	0.1	0.1=B	-
2.	0	8ml	0.5=T	Pink coloured solution

Calculation:-

$$\text{Acid value determination} = \frac{\text{No. of KOH run down} \times \text{Normality of KOH}}{\text{Wt. of Oil taken}} \times 56$$

$$= \frac{8 \times 5.6}{100}$$

Acid value = 4.48mg of KOH



Figure No. 22:- Acid value determination



Figure No. 23:-End result

3. Saponification value

Accurately weighed 2ml of oil into 250ml of conical flask and 10ml of ethanol: ether mixture (2:1) was added. To this flask 25ml of 0.1 N alcoholic KOH was added. Kept the flask for 30 min. and the flask was cooled. The cooled solution was titrated against 0.5N HCl using phenolphthalein indicator. Similarly the blank titration was performed

without taking oil (sample). Amount of KOH in mg used was calculated.

Calculation: Weight of oil taken = 2.06g
 Blank Reading = 20.5 ml
 Sample Reading = 16 ml
 Volume of used up KOH= (20.5-16) ml
 = 4.5 ml of 0.1 N KOH solutions

Titration

Sr no:	Burette reading			Difference
		Initial	Final	
1.	Blank	0	20.5 ml	4.5
2.	Sample	0	16ml	

Therefore, Saponification value of oil

$$= \frac{10 \times 56 \times 0.1 \times N \times (V_1 - V_2)}{W} \quad \text{mg of KOH}$$

W

$$= \frac{10 \times 56 \times 0.1 \times 4.5}{2.06} \quad \text{mg of KOH}$$

2.06

Saponification value = 122.33 mg of KOH



Figure No. 24:- Saponification value determination

2. pH:

The pH of herbal hair oil was determined using pH meter.

Procedure adopted:-

1. Prepare the pH meter: Make sure the pH meter is clean and calibrated. Follow the manufacturer's instructions for cleaning and calibration.
2. Prepare the oil: The sample should be at room temperature
3. Turn on the pH meter: Turn on the pH meter and let it warm up for a few minutes.
4. Immerse the electrode: Immerse the electrode in the oil. The electrode should be fully submerged in the oil.
5. Wait for the reading to stabilize: Wait for the reading on the pH meter to stabilize. The pH meter may take a few seconds to stabilize.
6. Record the pH reading: Record the pH reading on the pH meter.
7. Clean the electrode: Rinse the electrode with distilled water and dry it with a clean tissue or cloth. Store the electrode according to the manufacturer's instructions.

Result: The Final pH level of sample was found to be 6.8.



Figure No. 25:- pH meter reading

3. Specific gravity:

Take the specific gravity bottle, rinsed it with distilled water, dry it in oven for 15 minutes,

cool, closed it with cap and weigh it (a). Now fill the same specific gravity bottle with the sample and closed it with cap and again weigh it (b).



(26.1)

(26.2)

(26.3)

Figure No. 26: Weight of empty gravity bottle, bottle with distilled water, Bottle with oil sample

Determination of Specific gravity

- Weight of empty specific gravity bottle (W1) – 20.22g
- Weight of specific gravity bottle + oil sample (W3) - 44.34 g
- Weight of specific gravity bottle + Distilled water(W2) – 46.06 g

Calculation:

$$\begin{aligned}
 \text{Specific gravity} &= \frac{\text{Mass of oil}}{\text{Mass of equal volume of water}} \\
 &= \frac{W3 - W1}{W2 - W1} \\
 &= \frac{44.34 - 20.22}{46.06 - 20.22} \\
 &= \frac{24.12}{25.84}
 \end{aligned}$$

Specific gravity of oil sample found to be = 0.933 g/ml

4. Viscosity

The viscosity was determined using Ostwald’s viscometer.

Determination of viscosity

Specific gravity (density) of oil sample $\rho_2 = 0.933\text{g/ml}$

Density of water at room temperature $\rho_1 = 0.997\text{g/ml}$

Sr No.	Liquid Sample	Time of flow (sec)			Mean time(t)(sec)	Density(ρ) (g/ml)	Viscosity(η)
		1	2	3			
1.	Distilled water	21.94	21.37	21.13	t1=21.48 sec	0.997	0.893 cp
2.	Oil sample	21.33	20.91	20.75	t2= 20.99sec	0.993	0.816cp

$$\text{Viscosity of oil } (\eta_2) = \frac{\rho_2 t_2}{\rho_1 t_1} \times \eta_1$$

Where, ρ_1 - Density of water (g/ml)

ρ_2 - Density of oil sample

η_1 – Viscosity of water

η_2 – Viscosity of oil sample

t_1 - Mean time of flow of water from A to B

t_2 - Mean time of flow of oil sample from A to B

$$\begin{aligned} \text{Viscosity of oil } (\eta_2) &= \frac{0.933 \times 20.99}{0.997 \times 21.48} \times 0.8937 \\ &= \frac{19.58}{21.41} \times 0.8937 \\ &= 0.914 \times 0.8937 \\ &= 0.816 \text{ cp} \end{aligned}$$

Viscosity of prepared oil at room temperature = 0.816 cp



Figure No. 27: Ostwald viscometer

Results

One of the most well-known hair treatments is herbal hair oil. Harsingar herbal hair oils not only hydrate the scalp, but they help repair dry scalp and hair. It offers a variety of vital nutrients needed to maintain the healthy operation of sebaceous glands and encourages development of hair naturally. The numerous herbs used to make the herbal hair oil (Table 1) and their Table 2 displays the formulation's importance. the different factors, such sensitivity One of the most well-known hair treatments is herbal hair oil. Harsingar Herbal hair oils not only hydrate the scalp, but they help repair dry scalp and hair. It offers a variety of vital nutrients needed to maintain the healthy operation of sebaceous glands and encourages development of hair naturally. The numerous herbs used to make the harsingar herbal hair oil (Table 1) and their sensitivity herbal hair test, viscosity, pH, itchiness, grittiness, saponification value, and acid value .The harsingar oil was assessed (Table 3). Consequently, it was determined from the current investigation that the herbal hair oil has been biologically tested to the highest standards screening determines the herbal hair oil's effectiveness.

Conclusion

This study offers guidelines for using herbal substances to make herbal hair oils with little to no negative effects. Since all the substances used have various benefits and all the parameters indicated that they are within limits, this oil will aid in preserving healthy hair development, converting grey hair into

black, preventing dandruff, and producing lustrous-looking hair.

Discussion

The outcome of testing herbal hair oils within certain parameters. The outcomes of parameters like specific gravity, pH, acidity, and saponification value are in accordance with the accepted ranges. The herbal hair oil preparation has an acidic pH and is a light yellowish brown colour. The negative effect will not be seen in the manufactured formulation. Both of the two herbal hair oil compositions have a high potential for hair growth. The made-up herbal hair oil formulations promote hair growth, stop hair loss, stop dandruff, and lessen white hair. The most well-known hair care method is herbal hair oil. Herbal hair oil not only moisturizes the scalp, but also improves the condition of dry scalp and hair. It offers a variety of crucial nutrients needed to maintain healthy operation and encourages the growth of natural hair. The 20 Herbal hair oil was created using a variety of plants, and the formulation's significance was discussed. The evaluation of herbal hair oil included assessing its sensitivity test, viscosity, pH, imitation test, acid value, saponification value, and specific gravity. As a result, it was determined from the current investigation that the herbal hair oil formulation met all applicable standards, and subsequent standardisation and biological screening established the efficacy of the formulation in comparison to commercial Sesa oil.

Table 3: Evaluation of herbal hair oil

Sr. No.	Parameter	Inference	As Compared to marketed preparation
1.	Specific gravity	0.933	2.6
2.	Viscosity	0.81	4.9 cp
3.	Acid value	4.5	3.12
4.	Saponification value	122.33	191.03
5.	pH	6.8	4.10
6.	Sensitivity test	No irritation	No irritation
7.	Irritation test	No irritation	No irritation
8.	Grittiness	Smooth	Smooth

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