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Review Article

Formulation and Evaluation on Herbal Oil

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ABSTRACT

Herbal formulations always have lesser or no side-effects comparatively with synthetic. The aim of present study involves preparation of herbal hair oil Using the herbal ingredients like., Alma, Hibiscus, Bhringraj, Jatamansi, Raw garlic, Muskmelon Seeds, Moringa, Neem leaves, Guava leaves, Papaya leaves, Methi, Mimosa Pudica and Springonion. Based on the above observations, mixture of crude drugs was prepared in the form of herbal hair oil by boiling method. We have used five formulas using different herbal drugs and all the formulation are showing anti-hairfall property with some of other beneficial activities like anti-dandruff activity, improves blood circulation to the scalp and roots, reduce hair pigmentation, anti-fungal activity, reducing the whitening of the hair. The formulated herbal oil was evaluated by using Various parameters such as Organoleptic properties, Specific gravity, stability, viscosity, Acid value, pH etc. and the value obtained from it are found to be Similar to that of the standard values like there is no Sedimentation, no grittiness and shows satisfying Organoleptic properties and the results were Determined and are reported in this work.

INTRODUCTION

An essential part of human life is hair (1). Hair care products are those formulations which are used for cleansing, modifying the texture of hair, changing of the colour, giving life to the Stressed hair, providing nourishment to the hair and giving the healthy appearance to the hair. Hair oils are the hair care formulations applied for treatment of hair disorders such as baldness, aggression of hair,

discolouring of hair, hair falling and Dryness of hair. The canonical text on Ayurvedic medicine, the Charaka Samhitha, emphasizes the need of oiling the scalp and hair in order to preserve healthy hair and stop hair loss. It was advised to oil your hair every day with suitable herbs that suited other ingredients, and this practice has persisted to this day (2). The herbal hair oil formulation has significant quality and it provides various essential nutrients Used to maintain the normal functions of the sebaceous glands and promote the hair growth

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naturally. The traditional method in India involves making hair oils and mixing them with different medications that encourage hair growth. Given that Indian women are renowned for having long, lustrous, and healthy hair, it is not unexpected that self-care rituals heavily emphasize hair maintenance. Herbal hair oil not only moisturizes the scalp but also addresses dry scalp and hair conditions. It supplies essential nutrients necessary for the normal functioning of sebaceous glands and supports healthy hair growth. The plant extracts used in the oil are rich in flavonoids, polyphenols, saponins, tannins, vitamins, proteins, minerals, ricinolein acid, and other beneficial compounds. These ingredients promote hair growth and provide numerous benefits for hair health. Herbal hair oil strengthens hair and improves its texture. It delivers ample moisture to the scalp, helping to eliminate dandruff. Regular use increases blood circulation in the scalp, which aids in repairing damaged hair. It also minimizes hygral fatigue, the swelling and drying of hair. Furthermore, the oil protects hair follicles from surfactants by filling the gaps between cuticle cells, enhancing scalp health. Massaging the scalp with the oil promotes exfoliation, which can reduce hair fall. Different kinds of oils, such as castor, almond, coconut, and onion oils, are mixed with appropriate herbal medications and applied topically to the scalp. Because it absorbs into hair strands more effectively than other oils and is more cost-effective than other oils, coconut oil is the most deserving oil base of them all. For the finest hair development, coconut oil mixed to herbal medications is the recommended method

There are different types of evaluation test for hair oils such as (15):

- Acid value test
- Saponification test

- Viscosity
- Specific gravity
- Ph etc.

1. HAIR

Hair is one of the characteristics features of mammals and has various function such as protection against external factors i.e. heat, cold, etc. Hair is one of the important parts of body considered to be protective appendages on the body and Accessory structure of the integument along with Sebaceous gland and sweat gland.

1.1. Structure of hair:

➤ **Hair consists of two parts: Hair Follicle (5,6,7):**

The Follicle is a structure in the skin that resembles a club. There can be a network of blood vessels at the top of the follicle that supply nutrients to nourish and promote hair growth. We refer to this as the papilla. Every follicle is the result of a communication between the dermis and epidermis. The follicle is segmented into three parts:

1. **Infundibulum:** extends from the follicle's surface opening to the sebaceous gland entrance level.
2. **Isthmus:** Extends from the infundibulum to the level of insertion of the arrector pilli muscle.
3. **Inferior segment:** The base of bulb is invaginated by a tuff of vascularized loose connective tissue called dermal papilla. The papilla of the hair contains many blood vessels and provides nourishment for hair growth

Hair Shaft (5,6,8):



The hair shaft is divided into three layers:

1. **Medulla:** The medulla is the centre section of hair. It will either be continuous or doubled, or it will be divided or segmented. They are often packed with cells or resemble a hollow tube. The medulla is absent from the majority of hairs, but it might be broken or discontinuous in others. It creates the hair shaft's midsection. Particularly fine hairs typically lack this layer.
2. **Cortex:** The greatest portion of the hair shaft, or melanin (hair pigment), is what gives hair its colour.
3. **Cuticle:** The hair shaft's transparent outer coat may be called the cuticle. It is constructed from overlapping scales that shield the hair's inner layers. The hair's proximal end, which is closest to the scalp, and distal end are where the scales point.

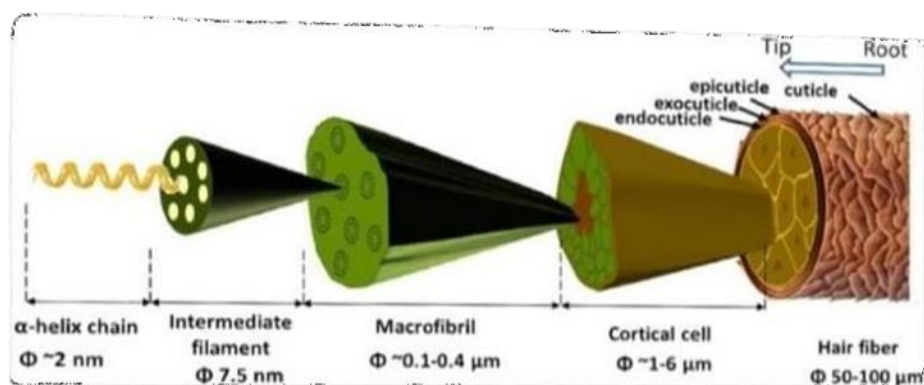
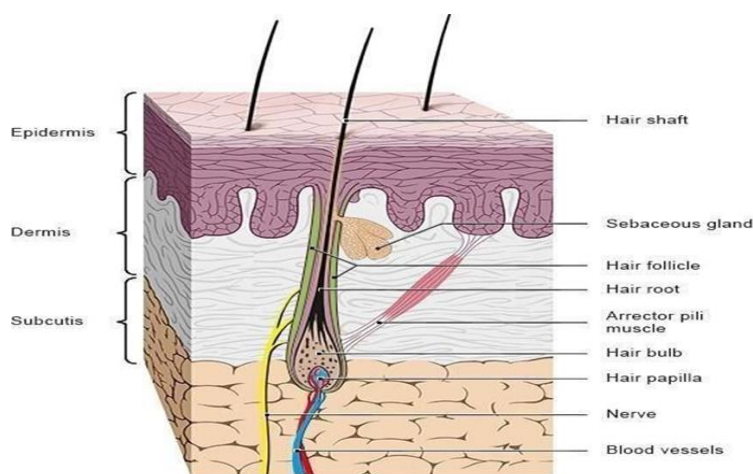


Fig 2: Structure of Hair

1. The basic part of hair is bulb, root and shaft.
2. Hair fall, dandruff, lice, Split end, grey hair are some of the well known problems related to hair.
3. A piece of hair looks simple but it is one of the most complicated structures in body. Hair is made up of two structures:-

Hair types

Hair type is primarily based on the curl pattern of the hair, which is determined by the hair follicle. Genetics play a key role in determining hair type. Andre Walker, who has been Oprah Winfrey's stylist for decades, is credited with creating a system that classifies hair into one of four curl patterns.

- Type 1: Straight
- Type 2: Wavy
- Type 3: Curly
- Type 4: Coily

Hair Growth Cycle (4):

Hair growth cycle consists of 3 stages: -

1. Anagen stage (Growth)
2. Catagen stage (Transition)
3. telogen stage (Rest)

Anagen phase: -

The anagen phase is the growth phase of the hair. The Anagen phase will last from Between 2-6 years. A new hair pushes the new hair that stopped growing up and out of the follicle.

1. Catagen phase: -

The catagen phase is a transitional stage and 3% of all hairs are in this phase at any given time. This phase lasts for 2-3 weeks.

2. Telogen phase: -

The telogen phase is the resting phase which lasts for about 2 -3 months. During the telogen phase, the hair follicle is at rest and the Club hair is completely formed.

2. Hair Oil

Hair care products include hair oil. Hair care products are characterized as compositions intended to cleanse, alter the texture of hair, nourish the hair, and preserve the appearance of healthy hair (11). Hair oils are hair care products that are used to the hair to address conditions like

baldness, graying hair, hair loss, and dry hair. They also aid in nourishing the hair (12). Due to the growing interest in herbal cosmetics among people, as well as the fact that their ingredients are readily available and their effectiveness is greater than that of their synthetic counterparts, herbal cosmetics are in high demand (13). A crucial component of herbal cosmetics is herbal hair oil. Herbal hair oil is increasingly widely utilized and preferred for many hair conditions (14). The use of hair oil is growing daily in tandem with people's rising standards of living. Herbal essences and scents are added to hair oil to give it natural flavors and colors.

Different types of herbal hair oil available in market

- i. Amla hair oil
- ii. Coconut hair oil
- iii. Bhringraj hair oil
- iv. Jasmine hair oil
- i. Brahmi hair oil
- ii. Cantharidine hair oil
- iii. Onion hair oil

3. Hair oil Benefit:

Their benefits are as follow:

- It provides natural goodness to hair. Herbal oil contains vitamins and micro nutrients which acts as a food for hair.
- Hair oil helps in preventing hair loss and frizzy hair. Hair ends needs special care and herbal oil pampers them throughout their nourishment.



- Regular use of hair oil of hair oils cure problem of premature grey hair.
- Keeps the scalp hydrated.
- Improves hair growth.
- Prevents dandruff.
- Offers shine glow.
- Stress relief.

Common hair diseases:

1. Natural diseases of hair growth
2. Acquired diseases of hair growth
3. Dandruff
4. Split Ends.
5. Frizzy Hair
6. Short Crown

History:

Hair oiling has its origin in Ayurveda, one of the prominent schools of medicine that offers holistic solutions. It originated more than 5,000 years ago and continues to benefit the mind, body, and soul. When you massage oil into your hair, you do not just strengthen your tresses, but also indulge in self-care. Hair oiling has been a part of hair care routines in several cultures. Dating back all the way to Ancient India, the centuries-old Indian science of Ayurveda involves hair oiling as one of its wellness methods.

Aim & Objective Aim:

Formulation and Evaluation of herbal hair oil is to develop a natural product that promotes hair health, including growth, strength, and shine,

while minimizing side effects commonly associated with synthetic hair care products.

Objectives of the present study are as follows:

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 normal function of sebaceous glands and promotes natural hair growth.

- Natural goodness of hair
- Relaxing massage for healthy scalp
- Fights against hair fall
- Control frizzy hair
- To promote the hair growth and smoothness of the hair.
- To supplement the hair with vital nutrients such as vitamins, and minerals.
- To prevent the dandruff, spit ends, and dull hair.
- To provide an alternative source from hazardous chemicals.
- Enhance hair growth by stimulating hair follicles and improving blood circulation to the scalp.
- Reduce hair fall by strengthening hair roots and minimizing damage from environmental factors and styling .
- Provide essential nutrients to the hair and scalp, improving hair texture, shine, and manageability.



- Increase hair strength and resilience, reducing breakage and split ends
- Hydrate the scalp and hair, preventing dryness and promoting a healthy moisture balance.
- Offer a natural alternative to synthetic hair care products, reducing the risk of allergic reactions and other side effects

Improve hair density and volume, making hair appear fuller and healthier.

- Shield hair from damage caused by pollution, UV rays, and other environmental stressors.

Plan of work:

The plan of work is having following points,

1. Sampling
2. Data collection
3. Tools of analysis

MATERIAL & METHODS MATERIALS

Coconut oil, Curry Leaves, Amla fruit, Fenugreek seed, Hibiscus flowers, Hibiscus leaves and Nagarmotha

roots are used.

Raw material characterization

1. Coconut Oil

Family- Aceraceae.

Scientific name- *Cocos nucifera* L.

Other names: Fossil oil.

Grease Lubricating oil

Parts used- kernel oil.

Geographical location: Southern India.

Active constituents- Fatty acid, capric Acid, lauric acid.

Uses- Used as vehicle, promotes hair growth and Moistures the hair follicles.



Fig 5: Coconut Oil

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.

Neem Leaves

- **Family:** Meliaceae
- **Scientific name:** *Azadirachta indica*
- **Other names:** Nimba (Sanskrit), Neem (Hindi/English), Vembu (Tamil), Veppam (Malayalam), Bevu (Kannada), Margosa
- **Parts used:** Leaves (also bark, seeds, and oil are used)
- **Geographical location:** Native to the Indian subcontinent; widely distributed across tropical and semi- tropical regions of Asia, Africa, and the Middle East



- **Active constituents:** Azadirachtin, Nimbin, Nimbidin, Quercetin, Salannin.



Fig 6: Neem Leaves

Uses:

Acts as a natural antibacterial and antifungal agent:

Useful in treating **skin infections, acne, eczema, and wound healing.**

Promotes healthy hair and scalp:

Helps combat **dandruff, lice, and itchy scalp** due to its **antimicrobial** properties.

Detoxifies the blood and supports liver function:



Fig 8: Amla Fruit powder

Phyllanthus emblica is an important medicinal plant in Indian traditional system of medicine. The tree is of 1-8 meter in height. The leaves are simple and intently set alongside branchlets. The flowers

are of greenish yellow colour. The Fruit is nearly round in shape and having hard appearance.

One amla contains up to 80 percent moisture making it a great natural skin conditioner.

1. Hibiscus Flower & Leaves

Family: Malvaceae

Botanical name: Hibiscus rosa-sinensis

Other names: Hibiscus arnottii Griff.

Hibiscus boryanus DC. Hibiscus cooperi auct.

Active constituents- flavonoids, tannins **Parts used:** Whole flower & leaves **Uses:**

- Hibiscus flowers are used to clout
- Premature greying of hairs.
- prevent hair loss and spilt ends.



Fig 9: Hibiscus Flower & Leaves

The leaves are alternate, ovate to lanceolate, frequently with a toothed or lobed Margin. The flowers are large conspicuous, trumpet- shaped with five or more Petals. This plant is extensively cultivated as an ornamental plant in tropical and Subtropical region. This plant is commonly found throughout the tropics and Is found as a house plant throughout the world.

Material (Ingredients) Used in Manufacturing of Herbal Hair Oil:

Table No 1: Material (ingredients) used in preparation of herbal hair oil

Sr. No	Ingredient	Quantity Taken
1	Coconut oil	100 ml
2	Neem leaves	8 unit
4	Amla fruit	2 gm
5	Hibiscus flower	3-4 unit
6	Hibiscus leaves	3-4 unit



Fig 11: Herbal oil Formulation

METHODS

Methods of Preparation

- Various ingredients such as coconut oil, Neem leaves, amla fruit, fenugreek seeds, hibiscus flowers and hibiscus leaves are used in the formulation of herbal hair oil.
- Firstly, coarsely grind the fenugreek seeds and gooseberry (amla).
- Take a glass vessel and transfer the powder into it.
- After that, add 100 ml of coconut oil into it. Also, add the curry leaves and hibiscus flowers.
- Now, add the hibiscus leaves to the oil.
- Switch on the stove and let it boil. In between, mix it well and allow it to boil on a low flame.
- Boiling takes 10 to 15 minutes. Boil until it gets a brownish color.
- Now, switch off the stove and allow it to cool down.

- After that, filter it twice with the help of a clean cotton cloth.
- To extract the oil completely, use a cotton cloth and transfer the mixture into it, then squeeze it.
- After extracting, transfer it into a container bottle and store it. Herbal oil is ready for use.

Experimental Work Evaluation Of Herbal Hair Oil:

The prepared oils were then subjected to physical and biological evaluation.

Physical evaluation:

In physical evaluation, parameters like specific gravity, pH, acid value, Saponification value are conducted.

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 calculate

- 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 $\rho = \frac{W3-w1}{w2-w1} \times \rho_{\text{water}}$

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

Table no 2: Physical Evaluation

	Parameters	Observation
1	Color	Brown
2	Odour	Characteristics
3	Texture	Smooth
4	pH	6.01
5	Specific gravity	0.88 g/cm ³
6	Smoothness	Smooth

Chemical Evaluation:**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.

$$\text{Acid value} = 5.61 \times n/w$$

N= No. of ml of 0.1M KOH W= Weight of substance

Saponification value:

2ml of herbal hair oil was weighed and transferred into a 25ml of conical flask. To this 25ml alcoholic KOH solution 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 = $(b-a) \times 28.05/\text{weight of substance}$

b=blank value a= assay value

Saponification values were determined and the Formulations were subjected to biological evaluation.

Table 3: Chemical Evaluation

Sr. No	Parameters	Observation
1	Acid value	0.68
2	Saponification value	28.05
3	Viscosity	1.07

Biological evaluation:**Primary skin irritation test:**

The prepared formulations were assessed for primary skin irritation test. Healthy human volunteers were selected for the study. The hair of each volunteer of 1cm² was shaved which could accommodate three test sites. It was cleaned with surgical spirit. The quantities of formulations were applied over the respective test sites were observed for erythema and Edema for 48hrs after application.

Table no 4: Biological evaluation

Sr. No	Parameter	Observation
1	Irritation test	Non irritant
2	Sensitivity test	Non sensitive

RESULT & DISCUSSION

The herbal hair oil was prepared with combination of coconut oil, Amla fruit, fenugreek seeds, Hibiscus flowers and leaves, and curry leaves as the base of the monograph analysis was performed according to WHO guidelines.

Physical evaluation

1. The color is brown.



2. The odor is characteristic.
3. The texture is smooth.
4. The pH level is 6.01

5. The specific gravity is 0.88 g/cm³.
6. The smoothness is consistent.

Chemical evaluation

1. The acid value is 0.68.
2. The saponification value is 28.05.
3. The viscosity is 1.07.

Biological evaluation

1. The irritation test result is non-irritant.
2. The sensitivity test result is non-sensitive.

CONCLUSION

Herbal oil provides numerous essential nutrients required to maintain 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 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 natural hair nourisher, helping in hair growth by the reduction of hair fall. Coconut oil moisturizes hair. Amla and Eclipta alba 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 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.

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