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## Formulation and evaluation of *Murraya koenigii* and *Trigonella foenum* for hair promoting activity with natural care

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### Abstract

The purpose of evaluation and formulation of polyherbal oil is to give influence the overall appearance of a person. In traditional system, herbs used for many medicinal purposes. The herb used to modify the texture of hair and apply on hair to treat the baldness, discoloration of hair, prevent hair loss, dryness of hair, etc. The aim of present work is to formulate the herbal hair oil from leaves of curry, fenugreek seed, onion extract, aloe vera, coconut oil, amla powder. The formulation was evaluated by different properties such as Viscosity, pH, Irritation test, Grittiness, Organoleptic properties, Refractive Index, Saponification value.

**Keywords:** Hair, herbal hair oil, fenugreek seed, onion extract, aloe vera, coconut oil

### Introduction

The concept of beauty and cosmetics are used from ancient times to enhance the appearance of human body. Mostly in ancient civilisation the herbs are only the cosmetics products which is used for their lesser side effects and more effectiveness. Hairs play an important role in human life. Hair has a protective role against the adverse effect of environment. For example, temperature.

Hairs are made up of cortical cells are composed of a protein, known as keratin. Keratin is a helical protein. There are two types of keratin fibres exist and they are: type I are acidic amino acid residues and type II are basic amino residues. Hair is one of the vital parts of our body. Hair influences the overall elegance of human being.

In Traditional Indian System of medicine many plants and herbal formulations are reported as hair growth promoter and improvement of quality of hair as well. Herbal formulations are known for their use since ancient times, because the herbal oils show minimum side effects and they have more activity for recovery of their related diseases. These hair oils are used to treat the hair problems like thinning of hairs, dryness and other. The hair oils are also useful for improve blood circulation in scalp and prevent dandruff also <sup>[1]</sup>.

### Hair anatomy

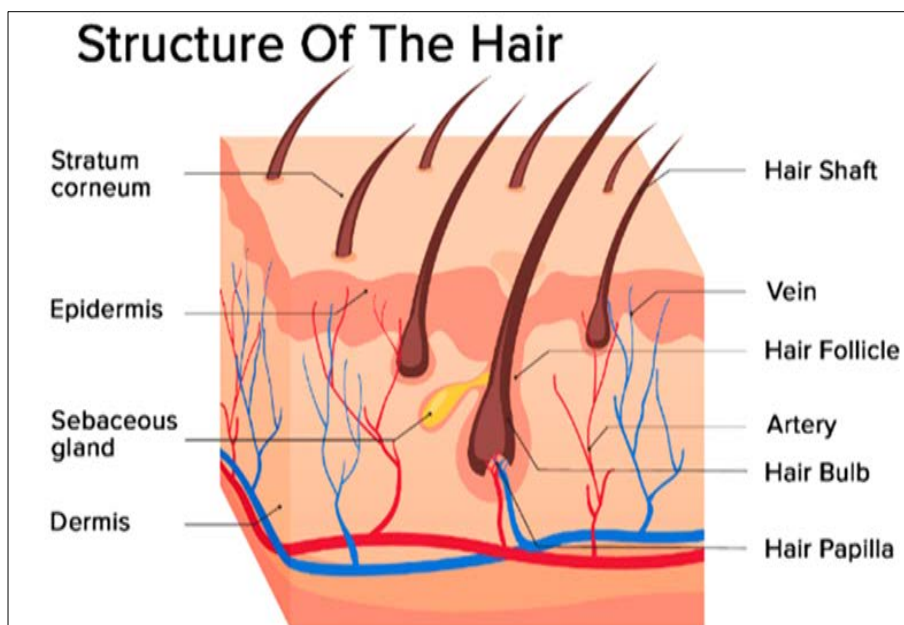
Hair oil or hair care products are categorized into two category, hair tonics and hair grooming aids. These are basically the extracts of medicinal plants in the form of oil. Today personal care products containing ingredient from the herb origin, which are getting an increasing trend in the pharmaceutical world. The nature oil is non sticky and addition of perfumes enhances the fragrance. The human hair is divided into three main morphological constituents, also components of the hair follicle: cuticle, cortex and medulla.

### Physiology of hair

#### Hair growth cycle

Hair development is a continuous cyclic process and all mature follicles go through a growth cycle consisting of growth (anagen), regression (catagen), rest (telogen) phases. The duration of the phase changes based on the location of the hair and so personal nutritional and hormonal status and age.

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**Fig 1:** Structure of the hair

**Anagen:** Almost 85-90% of all scalp hairs are in anagen. Dermal papilla formation is realized and the new hair shaft appears from the skin. This phase can last up to 6-8 years.

**Catagen:** At the end of anagen, mitotic activity of the matrix cells is diminished and the follicle enters a highly controlled involution phase known as catagen. Catagen lasts approximately 2 weeks in humans follicle site and follicle type.

**Telogen:** The telogen stage is defined as the duration between the completion of follicular regression and the onset of the next anagen phase. Telogen stage lasts for 2-3 months and Approximately 10-15% of all hair is in telogen stage.

**Different type of dandruff:** Dandruff types may be common on the scalp, there are some that could form on different parts of the body. Just as there are different causes of dandruff, there are different types of dandruff. Seborrheic dandruff, Fungal dandruff, Psoriasis dandruff, Sebum dandruff [2].

#### Aim and Objective

- To control on hair loss and premature hair greying.
- The main purpose of the preparation of herbal hair oil is, it contains less side effects and more benefits to the hair.
- They promote nourishment to hair and also hydrate the scalp.
- The youngsters and adults are mostly, have the hair problem due to life style and busy schedule and unhealthy diet.
- The motive of this is, to make healthy and naturally shiny and long hairs of women and men.

#### Objective

- To promote the hair damage and loss protect against the pollution and changing climate.
- To provide nourishment and essential nutrients to the hair, such as vitamin and mineral.

- To promote hair growth and smooth and shiny hair. To prevent dandruff, hair greying, split end, etc.
- To find out the hair related problems, causes of hair loss, white and grey color of hair.
- Identify the herbs that can recover the hair, and improve the treatment for them.

**Materials and Methods:** The polynomial herb oil was prepared by collecting various plant materials such as:

- Coconut oil
- Curry Leaves
- Fenugreek seed
- Aloe Vera
- Amla
- Onion

#### Coconut oil

**Synonyms:** coconut water, edible nut, copra oil.

**Biological name:** *Cocos Nucifera*, is important member of family *Arecaceae* (palm family) popularly known as coconut, coco, etc.



**Fig 2:** coconut oil

**Uses:** Coconut oil contains a high concentration of lauric acid (about 50%), a fatty acid with a strong affinity for proteins found in the hair. All parts of the fruit of coconut

tree can be used. Both the green coconut water and solid albumin ripe fruit are used industrially and in home cooking in many ways. Coconut oil can improve the health condition of your hair. It works by helping prevent protein loss in your hair. It is beneficial to apply to the hair both before and after washing it. Coconut oil reduced protein loss in hair, protein loss cause by undamaged, bleached, chemically treated and UV exposed. Additionally, several parts of natural of the fruit and plant have been used by people in different countries for the treatment of various pathological conditions. Currently, the use of natural coconut water is growing. Industry is using this for as a raw material for carpets, car seed stuffing and in agricultural as fertilizers. <sup>(4)</sup>

### Curry leaves

**Synonyms:** Allspice, Anise, Aniseed

### Biological source

*Murraya koenigii* (L) spreng. The tree is small, strong and smelling perennial shrub commonly found in forests as undergrowth the family *Rutaceae*.



**Fig 3:** Curry leaves

### Uses

Curry leaves contain vitamin C and vitamin B, protein and anti-oxidant, which promote healthy circulation to the blood vessels in the scalp and boost overall health of scalp. Curry leaves for hair are extremely useful as they are loaded with sources of amino acid. Add shine to hair, prevent the premature greying of the hair and provide nutrients. Curry leaves are packed with essential nutrients, vitamins, and proteins that help nourishes the scalp, and strengthen the hair follicles, and they also prevent the hair loss. Nutrients are like calcium, iron, and phosphorous, used to provide nutrients. They have ability to fight and treat fungal, bacterial and protozoal infections. Thus, they clear dandruff. Curry leaves are fully loaded with anti-oxidants and alkaloids, help repair hair damage. Curry leaves contain an oil that acts as a magic remedy to improve the scalp health. The antioxidant-rich oil nourishes the scalp while they remove the all type of dead skin cells. They are full of vitamin B 5 which work wonders for strengthening hair from the roots. The vitamin B5 also helps to fight split end formation and breakage <sup>[5]</sup>.

### Fenugreek seed

**Synonyms:** Herbaceous plant, Genus *Trigonella*, Greek clover, Chandrika, Methi.

**Biological source:** *Trigonella Foenum Graecum*. It is a annual plant belongs to family *Leguminosae*.



**Fig 4:** Fenugreek seed

### Uses

These Seeds are used as natural home remedy for thinning hair. Fenugreek seeds can promote hair scalp health. Fenugreek seed has long been used to treat condition that leads to dry, irritation skin, including dandruff. The seeds effectively treat all causes of dandruff and scalp irritation. They possess anti-inflammatory, anti-fungal, moisturizing, skin soothing and wound healing properties. Protein, essential fats, zinc, iron are some of the nutrients that may play a role in supporting hair growth properly <sup>[6]</sup>.

### Aloe Vera

**Synonym:** *Aloe barbadensis* Mill, *Aloe barbadensis* var. *chinensis* haw, Aloe elongate Murray, Aloe indica royle.

### Biological source

*Aloe barbadensis miller*. It belongs to family *Asphodelaceae* (*Liliaceae*). It is shrubby, perennial, xerophytic, succulent, pea-green colour plant.



**Fig 5:** Aloe vera

### Uses

It's beneficial for many skin problems like wounds, acne and burns. Aloe vera is also consumed as food and drinks and may have benefits for inflammatory bowel disease, diabetes, hepatitis and more. Strengthens hair: Aloe vera has many active ingredients and minerals that can help strengthen your hair. It has fatty acids and amino acids and is rich in vitamins A, B 12, C, E. these plays role in healthy

hair follicles. Controls greasy hair: Aloe vera has enzymes that break down fats and so strips your hair of any extra oil (sebum). Aloe vera protect from UV damage: UV exposure can cause your hair to lose its shine and colour, and make it rough and less elastic, leading to break the hair. Aloenin is a chemical compound in the plant, is a primary factor in promoting hair growth, as found in people with a hair loss condition called alopecia. It has been used to improve hair growth and lessen breakage, which contribute to hair growth. Aloe vera gel is used commercially as an ingredient in yogurts, some desserts, but at high or prolonged doses, ingesting aloe latex or whole leaf extract can of topical aloe vera in small amounts is likely to be safe [7].

### Amla

**Synonym:** *Emblca officinalis*, Indian gooseberry, *Emblca myrobalans*, and Amla

**Biological source:** *Emblca Officinalis* is a medium size tree belonging to the family Euphorbiaceae.



**Fig 6:** Amla powder

### Uses

Amla has a property to condition your hairs. They promote healthy hair growth, and improve the tone of henna hair dyes. They minimize the greying of hair. Boost the volume of hair, also reduce the dandruff along with this treat the lice on head. Amla consists of active constituent that vitamin E supports to healthy circulation while applying the amla topically on hair may promote healing and cell regeneration in given area. The topical application of amla delivers the Vitamin C, Tannins, Phosphorous, Iron, Calcium. The vitamin C and anti-oxidants can help skin cells regenerate. This may promote a healthier scalp and also minimizing dandruff and resulting in healthier hair. In 2017 preliminary study, which was taken on a mice and they found that a patented herbal mixture containing amla powder might stimulate hair growth among people who experience the hair loss mostly [8].

### Onion

**Synonyms:** *Allium Cepa*, green onion, Spanish onion, Bulb onion, spring onion, vidalia onion.

### Biological Source

An onion is *Allium Cepa* L. from Latin cepa means 'onion' also known as the bulb onion or common onion, is a vegetable that is the most widely cultivated species of genus *Allium*. Belonging to the family *Amaryllidaceae*.



**Fig 7:** Onion

### Uses

Onion juice helps improve blood circulation to scalp thereby providing proper nutrition to the hair follicles. It is believed to not only soothe the scalp, and strengthen the strands but also lead to new hair growth. A study tested that the effectiveness of onion juice for hair in treating Alopecia areata (patchy, non-scarring hair loss condition). Soothes the scalp: Onion juice has natural anti-inflammatory properties that help to soothe the scalp irritation and regulate the scalp and promote a healthy scalp.

Controls the dandruff: Owing to its anti-microbial and anti-fungal properties, onion helps control seasonal dandruff and nicely cleanses the scalp. Prevent Greying: Onion juice is also believed to help with controlling premature greying. It contains a compound 'catalase' that is known to help control the early greying of roots and help restore the natural colour of the hair. Revitalises dry hair: Onions are rich in flavonoids that act as anti-oxidants and anti-inflammatory agents. They play a vital role in nourishing the scalp by enhancing blood flow in the scalp thereby revitalising dry and damaged hair [9].

### History

Ancient Egyptian gave special attention to hair and images of hairdresser. Archic texts found during this era had information about 'recipies' used by the Egyptians to cure baldness. During this time of period people used combs and ointments to groom and style their hair for good looking. Ancient Egyptian used castor and almond oil to moisture and protection of hair:- Ancient Egyptians was a hot and dry. Hair moistures gave protection from that climate. The Egyptian women massage their hair castor oil and almond oil onto their scalp, for which, they believed also promoted hair growth. Assyrian hairstyling involving iron bars and fire:- Assyrian kings around 1500 BC, liked to curly hairstyles. To achieve the look, they had hair curled with iron bars with heated that iron bars in the fire. Now a days we used hair dryer and straightners for give shape to hair. There are numerous ancient beauty secrets that the people used to stay beautiful in those days. The best remedies are used by the queens only. Nearly all our queens were known to be beautiful and they spend hours to taking care of their skin and hair. In India, the royalty of queens were in their long and shiny, lustrous hair [10].

Our queens used home remedies or Ayurvedic remedies because they have less chemical based products. These remedies gave them long lasting beauty. They look special care of their hair and hair growth as hair were a huge sign of beauty and personality.

### The origin of beauty and hair care in India

The story behind the evolution of beauty and hair care industries are long. The usage of beauty products and cosmetics has been a tradition in India. Actually, the earliest records of cosmetics products and their application date back to indus valley civilization, 1550 BC.

The best ancient Indian hair care secrets are as following:

#### Oiling

The oil is best ancient Indian hair growth secrets, oiling is crucial to getting the desired and effective hair growth. Indian hair care focuses on hair oils.

The olive oil, Almond oil, Good old Castor oil or a mixture of these oils, and its become a part of hair care related routine. Pollution, heat, chemicals and sun dries damage and make them dry. So, it is necessary to get back moistures. The hairs oil moistures and deeply conditions the scalp and roots from where the rest of your hair gets the nutrition to promote health. The hair get oiling massage to improves blood flow and stimulates the hair follicle for hair growth.

#### Shikakai

Shikakai termed as 'Fruit for hair' is a natural product of herbs to cleanse the hair. It can be used as a homemade shampoos that are free from chemical. Shikakai strengthens the hair naturally and promote the hair growth. It keeps the scalp clean and healthy by maintaining pH level of it. And fight the infections. Shikakai also have properties to prevent the greying of hair.

#### Egg

Eggs contain all nutrient that are require for hair. Egg white acts as a perfect substitute for all the shampoos. To use the egg, apply it to the roots and allow them to absorb all the nutrients for 15-20 min. Eggs deeply nourish your hair and provide them the nutrient which they needed. This hence they promotes hair growth. Indian hair secrets also suggest using the eggs to condition the hair.

#### Gooseberry

Gooseberry is used in India for well-known use of them. The gooseberry is used along with lemon, It definitely roots the hair growth and keep the hair healthy. They have high vitamin c source to stimulates collagen production and helps with hair growth<sup>[11]</sup>.

**Table 1:** Formulation of Polyherbal Hair Oil

Sr. No.	Ingredients	Quantity
1	Curry leaves	5gm
2	Fenugreek seed	5gm
3	Amla	5gm
4	Aloe Vera	5ml
5	Onion	5ml
6	Coconut oil	50ml
7	Perfume	q.s.



**Fig 8:** Preparation of virgin coconut oil

#### Extraction of herbs

- **Coconut oil:** (Virgin coconut oil) Take 5 large coconut, flesh from shell, rinse with water, then cut into small pieces. Blend the small pieces into blender with water, blend until smooth paste and milky paste is visible. Take the milk into a bowl, then cover for overnight (12 hr) for fermentation to begin, the cream is settles at the top. Place into freezer for 30-45 min, until the top become hard. Now remove the top layer from water and heat it in a pot over medium flame. Stirring occasionally to prevent burning, until the oil has been separated and allow to cool and strain.
- **Curry Leaves:** Take 12-15 leaves of curry. Wash them, and let them dried. Then the leaves directly add into oil and boil it. Boiled the leaves until the leaves become brown.
- **Amla:** Take amla fruit and cut into small pieces, dry it under sunlight. After drying, blend it and make a smooth powder.
- **Onion oil:** Take 2 onion and cut into small pieces, blend in blender and make a paste of it. Then filter the paste through a cloth. The water is collected as onion oil.
- **Aloe vera:** Take aloe vera leaf, wash it. Cut the aloe vera in 2 parts and separate out the gel, and preserve gel.

#### Method and Preparation of Polyherbal Hair Oil

1. Herbs are weight by using weighing balance whereas oil are measured through pipette.
2. The oil and herbs are mixed together in a vessel.
3. The above mixture is then allowed to boil on low flame with continuous stirring. So, as to avoid the adherence of the medicinal plants to the bottom of the vessel.
4. At this step moisture of the medicinal plant commenced to evaporate so it is agitated frequently and carefully ensure that the mixture does not stick at the bottom of vessel.
5. The herbs are taken out from time to time to know the condition and stage of mixture of oil.
6. As further heating to the content, the oil starts to form a froth. This is the condition where all the active

ingredients of medicinal plants starts to concentrate in oil.

7. In the next step, the mixture is filtered.
8. The collected strain is final herbal hair oil product.

**Table 2: Phytochemical Test**

Sr. No.	Herb	Phytochemical test	Inference
<b>Test for tannins and phenolic compounds</b>			
1	Coconut Oil	Ferric Chloride Test: To the aq. Extract few drops of fecl <sub>3</sub> solution were added.	Presence/Absence of tannins and phenolic compounds
<b>Test for Amino Acids</b>			
2	Fenugreek seed	Ninhydrin Test: The aq. extract is treated with solution NaOH and lead acetate solution and boiled.	Presence/Absence of amino acids
<b>Test for Flavonoids Compounds</b>			
3	Curry leaves	Shinoda Test: To ethanol extract, add few drops of lead acetate solution.	Presence/Absence of flavonoids compounds
<b>Test of tannins and phenolic compounds</b>			
4	Aloe vera	Ferric Chloride: To the aq. Extract few drops of fecl <sub>3</sub> solution were added.	Presence/Absence of tannins and phenolic compounds
<b>Test for Flavonoids Compounds</b>			
5	Onion	Shinoda Test: To ethanol extract, add few drops of lead acetate solution.	Presence/Absence of flavonoids compounds
<b>Test of tannins and phenolic compounds</b>			
6	Amla	Ferric Chloride: To the aq. Extract few drops of fecl <sub>3</sub> solution were added.	Presence/Absence of tannins and phenolic compounds

### Evaluation Parameter

The general characters like color and odor were evaluated manually and the physical evaluation was carried out by testing the evaluation parameters such as specific gravity, ph, viscosity, refractive index, acid value, saponification value.

- **Specific Gravity:** Take the specific gravity bottle, rinse it with distilled water, dry it in the oven for 15 min, cool, close it with a cap and weigh it (a). Now fill the same specific gravity bottle with the herbal hair oil and close it with a cap and again weigh it (b). Determine the weight of the sample per milliliter by subtracting the weight (b-a).
- **pH:** The pH of polynomial hair oil was determined by using a pH meter. The most accurate common means of measuring pH is through a lab device called probe and meter or simply, a pH meter. The probe consist of a glass electrode through which a small voltage is passed. Thermometer, a voltmeter, measure the electronic impedance in the glass electrode and displays pH units instead of volts. A pH meter typically has to be calibrated before each use with two standard liquid solution of known pH. Measurement is made by submerging the probe in the hair oil until a reading is registered in the pH meter.
- **Organoleptic property:** Color, odor, skin irritation was determined manually. Oil was applied on hand and exposed to sunlight for 5 min to check for any irritation over skin.

- **Sensitivity Test:** The prepared herbal hair oil was applied on 1cm skin of the hand exposed to sunlight for 4-5 minutes.
- **Saponification value:** 2 g of oil was accurately weighed and transferred into a 250 ml iodine flask. 25ml of 0.5M alcoholic KOH was added and boiled under reflux in a water bath for 30 min. Phenolphthalein was added as an indicator and titrated against 0.5 m HCL (a) similarly blank was performed (b) without the sample. Saponification value: 28.05 (b-a)/W.
- **Viscosity:** It is an index of resistance of a liquid to flow, the higher the viscosity of a liquid, the greater is the resistance flow. The viscosity was determined by using Ostwald's viscometer.

### Result

**Table 3: Evaluation Parameter**

Sr. No.	Parameters	Observation
1	Color	Brown
2	Odor	Characteristic
3	Grittiness	No
4	Viscosity	Low
5	pH	6.49
6	Specific Gravity	0.845
7	Sensitivity test	No Irritation
8	Saponification value	239.10
9	Acid value	2.5

**Table 4: Phytochemical Screening**

Sr. No.	Test	Observation	Inference
1	Tannins Test – Coconut oil, Aloe vera, Amla	Dark black color form	Positive
2	Amino Acid Test – Fenugreek seed	No black ppt is form	Positive (White ppt observed)
3	Flavonoids Test- Curry Leaves, onion oil	Yellow ppt formed	Positive



**Fig 9:** Flavonoid test for curry leaves



**Fig 10:** Flavonoids test for Aloe vera



**Fig 11:** Flavonoids test for Onion



**Fig 12:** Tannins test for Coconut oil

### Discussion

In day-to-day our life style has been changed, so differently. The workload increases, along with this. Hypertension, stress, migraine, lack of sleep, unhygienic food, etc. 99% people are suffer from these problems but due to the daily life schedule, they ignore the hair problem. And after some time they may be face to the alopecia disease.

Herbal hair oil is most widely used hair oil, it used widely because they have versatile effects to hair. They provide goodness to hair. The harbal hair oil is rich in nutrients which acts as a food to the hair. In that condition, some people consult the physician and are not able to face any other with this, and if any serious condition they may isolated themselves. And never want to talk about this. While doing this, they loss their self confidance.

The herbal hair oil consist of coconut oil, curry leaves, fenugreek seed, amla powder, aloevera, onion oil, banyan tree, jasmine flower. They were used for their effect against the hair related problem. They were used for their effect against the hair related problem. The phytochemical parameter and evaluation test were give positive results. The prepared formulation is brown is color. The pH is 6.83 and

the hair oil have characteristic odor. There is no grittiness observe, Acid value is 4.488 with specific Gravity is 0.79. The phytochemical parameter and evaluation test were give positive test.

### Conclusion

The Hair loss is a major problem associated with normal changes. Many of the people were complaining about, they suffer from alopecia. The baldness of a person depressed them and low their confidence and sometimes the most of people do not come in contact with others or they isolate themselves. Mostly the young population have problems due to pollution, dust, junk food and other chemical hair products. So, the herbal hair oils are used widely for their less side effects and more beneficial activities. The herbal hair oil is most commonly used all over the India. These hair oil are have versatile effect to the hair. Herbs improves the appearance of person and stay confidant. They are made up of various herbs accroding to their benefits of hair. They are treating the hair from pollution and other hair loss problem, like alopecia, pre-mature greying of hair. Hair oil are well known formulation to hair treatments. Herbal hair oil used

to moistures the scalp, and help in the dry condition, they act as anti-dandruff and have hair thickening properties. They promote the healthy and shiny hair growth and play important role in hair conditioning.

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