



FORMULATION AND PRIMARY EVALUATION OF POLY HERBAL HAIR OIL

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ABSTRACT

Now - a - days there is a wide use of herbal cosmetics due to the belief that they have fewer side effects and better safety. The aim of present study involves preparation of herbal hair oil using the herbal ingredients like, Coconut Oil, Hibiscus, Fenugreek, Aloe Vera, Henna, Curry Leaves and Rose Petal. Based on the above observations, mixture of crude drugs was prepared in the form of herbal hair oil by boiling method. The formulated herbal oil was evaluated by using various parameters such as Organoleptic properties, specific gravity, stability, viscosity, Acid value, pH etc. were determined and are reported in this paper.

KEYWORDS: Cosmetics, Herbs, Herbal hair oil, Evaluation, Anti dandruff.

1. INTRODUCTION

Chemicals called cosmetics are applied to the human body to improve its look or smell. Skin care products such as lotions, sprays, powders, lipsticks, coloured contact lenses, eye and facial makeup, permanent waves, hair colours, sprays and gels, deodorants, baby items, bath oils, bubble baths, bath salts, butters, and many more are all considered cosmetics. "Make-up" is a term used to describe a subset of cosmetics, mostly coloured items meant to change the user's appearance. Many manufacturers make a distinction between cosmetics for care and cosmetics for decoration. Over the past three to four decades, there has been a significant surge in the usage of cosmetics among both males and girls. Hair oil, creams, and dyes are equally popular among men and women. Nowadays, the majority of nations have rules governing the production, labelling, selling, and other aspects of cosmetics in a way that prevents their usage for health-harmful purposes.

1.1 Human hair

All mammals have hair, a characteristic that none of the other species have. It is a unique and treasured characteristic of humans, particularly in women, but its primary purposes are to protect the skin from mechanical insults and to promote homoeothermic responses. For instance, the hair on the scalp shields the head and neck from sunlight, cold, and physical harm, while the eyebrows and eyelashes keep objects out of the eyes. Considering the psychological influence on quality of life shown in hair diseases, such as hirsutism, hair loss, etc., it also performs vital roles in sexual and social

communication. Additionally, it has a sensory function, increasing the perception of the skin surface for tactile sensations.

1.2 Hair cycle

A hair is the result of multiple keratinocyte layers in the hair follicle working together. The process of developing hair is dynamic and cyclical, with multiple hormones and cytokines coordinating the length of growth cycles. Other factors that affect this process include the individual's age and developmental stage, dietary habits, and environmental changes like day length. The primary agents in this cycle are cytokines, or hormones, which have the ability to tell follicles to adapt in the right ways, allowing each hair to develop at a distinct stage from its neighbouring hairs. Hair follicles grow in cyclical patterns where phases of fast growth and hair shaft creation alternate with phases of relative hair follicle quiescence and regression caused by apoptosis.

In particular, the hair growth cycle can be divided into three distinct phases

- 1) Anagen or growth phase
- 2) Catagen or transitional phase and
- 3) Telogen or resting phase.

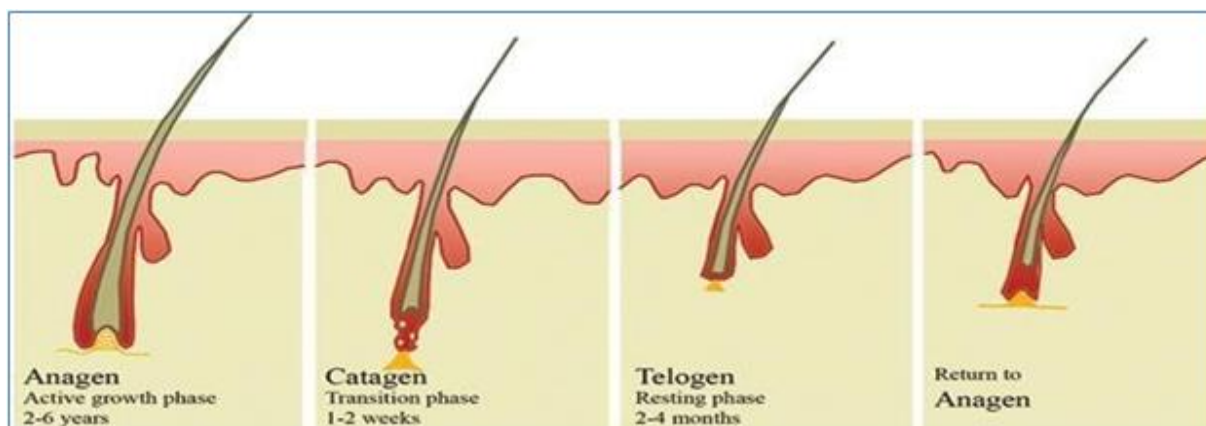


Fig. 1: Hair cycle.

2. Plant profile

2.1 Coconut oil

Name: Coconut oil.

Synonyms: Copra oil, coconut kernel oil, coconut milk oil.

Biological source: It is expressed from the dried solid part of endosperm of *Cocos nucifera*.

Family: *Arecaceae*.

Chemical constituents: The oil contains about 95% of saturated fatty acids with 8 and 10 carbon atoms. It shows the presence of caprylic acid; capric acid 50-80%; lauric acid; and myristic acid.

Uses

- ✚ Promotes hair growth.
- ✚ Moistures hair follicles.
- ✚ Anti-inflammatory.
- ✚ Relieve dandruff.
- ✚ Restore luster to dry and damaged hair.
- ✚ Anti-oxidant & prevent skin infections.

2.2 Curry leaves

Name: Curry leaves.

Synonyms: Curry leaf, mitha, karuveppilei.

Biological source: Obtained from leaves of *Murraya koenigi*.

Family: *Rutaceae*.

Chemical constituents: Curry leaves were found to contain mostly oxygenated mono terpenes. The active constituents found in curry leaves were Linalool (32.83%), Elemol (7.44%), Geranyl acetate (6.18%), Myrcene (6.12%) and Allo-ocimene (5.02%).

Uses

- ✚ Promoting hair health.
- ✚ Aiding digestion.
- ✚ Anti-inflammatory.
- ✚ Anti-oxidant & prevent skin infections.

2.3 Fenugreek

Name: Fenugreek.

Synonyms: Bird's foot, Alhova.

Biological source: It is obtained from leaves of *Trigonella foenum-graecum*.

Family: *Fabaceae*.

Chemical constituents: Fenugreek mainly contains Alkaloids - Trigonelline, Gentianine and carpaine, they contain amino acids - Leucine, arginine, histidine and lysine, they also contain Flavanoids – Quercetin, Apigenin, luteolin, Iso-vitexin and vitexin.

Uses

- ✚ Promotes hair growth.
- ✚ Anti-inflammatory effects, anti-dandruff.
- ✚ Antimicrobial property.
- ✚ Analgesic or pain-relieving effects.
- ✚ Anti-diabetic effects.

2.4 Aloe vera

Name: Aloe vera.

Synonyms: Aloe barbadensis, Aloe humilis Blanco, Aloe Indica Royle.

Biological source: It is obtained from dried juice of the fleshy leaves of *Aloe barbadensis*

Family: *Liliaceae*

Chemical constituents: The chief chemical constituents are Aloe-emodin, aloin or barbaloin, iso-barbaloin, aloesone, cape aloes contain aloinosides A and aloinosides B and resins resinotannol + cinnamic acid or coumaric acid.

Uses

- ✚ Promoting hair health.
- ✚ Anti-dandruff, treat hair loss.
- ✚ Anti-inflammatory, treat itchy scalp.
- ✚ Anti-oxidant & prevent skin infections.

2.5 Henna

Name: Henna.

Synonyms: Mehendi, Hina, Egyptian Private.

Biological source: Obtained from leaves of *Lawsonia inermis*.

Family: *Lythraceae*.

Chemical constituents: Lawsone the key compound responsible for henna's dyeing properties. Tannins: Contribute to its astringent and antimicrobial properties. Gallic Acid: Another important component of henna.

The Other constituents include phenols, anthraquinones, glycosides, white resin, sugars, and xanthenes.

Uses

- ✚ Antifungal and antimicrobial properties.
- ✚ Maintain scalp health.
- ✚ Anti-inflammatory.
- ✚ Anti-oxidant & prevent skin infections.
- ✚ Improve hair elasticity.
- ✚ Reduces premature greying of hair.

2.6 Hibiscus

Name: Hibiscus.

Synonyms: cotton rose, roselle, Rose of Sharon.

Biological source: It is obtained from leaves and flowers of *Hibiscus rosa-sinensis*.

Family: *Malvaceae*.

Chemical constituents: (Leaves) leaves of hibiscus mainly consist of Phlobatannins, saponins, stigmasterol, ergosterol, citric acid, tartaric acid and oxalic acid.

(Flowers) flower of hibiscus mainly consist of anthocyanin, poly phenols such as quercetin, thiamine, riboflavin, niacin and apigenidin.

Uses

- ✚ Anti-oxidant.
- ✚ Anti-dandruff, treat hair loss.
- ✚ Anti-inflammatory, treat itchy scalp.
- ✚ Anti-parasitic.
- ✚ Anti-microbial.
- ✚ Prevent skin infections.

2.7 Rose petal

Name: Rose petal.

Synonyms: Damask rose, Iranian rose, Taif rose.

Biological source: It is obtained from petals of *Rosa damascena*.

Family: *Rosaceae*

Chemical constituents: The main chemical constituents of rose petal is Geraniol, Nerol, Citronellol, Rose oxide, Heneicosane, Phenethyl alcohol, methyl Eugenol and monoterpene.

Uses

- ✚ Promoting hair health.
- ✚ Controls dandruff.
- ✚ Anti-bacterial activity.
- ✚ Anti-dandruff, treat hair loss.
- ✚ Anti-inflammatory, treat itchy scalp.
- ✚ Anti-oxidant effects.



Fig. 2: Herbal plant.

3. MATERIALS AND METHODS

3.1 Materials

Table 1: Materials list.

S. No.	Ingredients	Application
1	Coconut Oil	Active Ingredient
2	Curry Leaves	Active Ingredient
3	Fenugreek	Active Ingredient
4	Aloe Vera	Active Ingredient
5	Henna	Active Ingredient
6	Hibiscus	Active Ingredient
7	Rose Petal	Active Ingredient

3.2 Preparation of Herbal Hair Oil

Table 2: Preparation table.

S. No.	Ingredients	Quantity (%)
1	Coconut Oil	81%
2	Curry Leaves	4%
3	Henna	4%
4	Hibiscus	4%
5	Fenugreek	3%
6	Aloe Vera	2%
7	Rose Petal	2%

Procedure

Collect precisely all the dried and fresh herbs such as curry leaves, Fenugreek, henna, aloe vera, rose petals, hibiscus flower and hibiscus leaves weighed and grinded in the mixture and added the pure coconut oil. The above content was boiled for 30 minutes in iron utensils or pan. Become until dark colour produced. After boiled the oil to stable in overnight (24 hours) and was filtered through muslin cloth. Finally small amount of flavouring agent was added to the HERBAL HAIR OIL and it was stored in Amber colour bottle.

3.3 Phytochemical evaluation

- ✚ Test for Carbohydrates (Molisch Test)
- ✚ Test for Alkaloids (Mayer's Test)
- ✚ Test for Steroids and Sterols (Salkowski test)
- ✚ Test for Glycosides (Killer kiliani test)
- ✚ Test for Saponins (Foam test)
- ✚ Test for Flavonoids (Alkaline reagent test)
- ✚ Test for Terpenoids (Copper acetate test)
- ✚ Tests for Tannins (Ferric test)

3.4 Evaluation parameters

Prepared herbal hair oil was estimated for product performance which includes physicochemical parameters.

3.4.1 Physical parameters

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

Organoleptic property

- ✚ **Color:** Detected by naked eyes.

3.4.2 Chemical parameters

Table 3: Chemical parameters.

S. No.	Test & Procedure	Calculation	Image
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	Acid value = $5.61 \times n/w$ $n =$ No. of ml of 0.1M KOH $w =$ Weight of substance $= 5.61 \times 2.5 / 10$ $= 14.025 / 10$ $= 1.4025$	

- ✚ **Sensitivity:** The prepared herbal hair oil was applied on 1 cm skin of hand and exposed to sunlight for 4-5 min.

- ✚ **Grittiness:** Rubbed to the skin and observed

- ✚ **Sedimentation:** Keep the whole preparation aside for overnight and check for sedimentation.

- ✚ **PH:** The PH was determined by using digital PH meter. 20ml of herbal hair tonic was taken in a beaker and the bulb of PH meter was dipped in hair tonic. The obtained PH values are noted down.

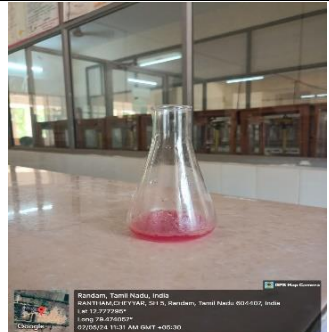
- ✚ **Specific gravity:** Take the specific gravity bottle, rinsed it with distilled water, dry it in oven for 15 minutes, cool, closed it with cap and weigh it (a). Now fill the same specific gravity bottle with the sample and closed it with cap and again weigh it (b). Determine the weight of sample per milliliter by subtracting the weight (b-a).

Specific gravity of hair oil was calculated as $\rho = w_3 - w_1 / w_2 - W_1 \times \rho$

- ✚ **Viscosity measurement:** The viscosity of prepared herbal hair oil was estimated by Ostwald's Viscometer at a room temperature. The viscosity of prepared herbal hair oil was calculated by using the equation.

$$\text{Viscosity of liquid } (\eta_2) = \frac{\eta_1 \times f_2 \rho}{f_1 t_1}$$

- η_1 = Viscosity of water
- ρ = Density of sample
- t_2 = Mean time of oil from A to B
- η_1 = Density of oil
- t_1 = Mean time of flow of water from A to B

	as faintly pink after shaking for 30 minutes. Acid value was calculated from the following equation.		
2.	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 = $(b-a) \times 28.05 / \text{weight of substance}$ $b = \text{blank value}$ $a = \text{assay value.}$ $= 28.05 (21.3 - 0.5) / 2$ $= 28.05 (20.8) / 2$ $= 583.44 / 2$ $= 291.72$	

3.4.3 Biological parameters

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.

Anti-Fungal activity

The formulated hair oil were inoculated on the plates of agar media by streak plate method and a control ketoconazole was prepared by Herbal hair oil. The plates were placed in to the incubator and are incubated at 37 °C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.

4. RESULTS AND DISCUSSION

4.1 Preliminary phytochemical screening

Results of the Preliminary Phytochemical Constituents present in Herbal Hair Oil.

Table 4: Preliminary phytochemical screening.

S. No.	Constituents	Herbal hair oil
1.	Alkaloids	+
2.	Carbohydrates	+
3.	Protein	-
4.	Terpinoids	-
5.	Phenols	-
6.	Tannins	+
7.	Flavonoids	+
9.	Glycosides	+
10.	Saponins	—
11.	Phytosterols	+

+ = Present

– = Absent

4.2 Evaluation of herbal hair oil

Table 5: Evaluation of Herbal Hair Oil.

S. No.	Parameters	Inferences
1	State	Liquid
2	Color	Dark Brown Color
3	Odour	Aromatic Odour
4	p ^H	8.2
5	Grittiness	Smooth
6	Specific gravity	1.096
7	Viscosity (centipoise)	0.91
8	Sedimentation	No Sedimentation
9	Sensitivity test	No Irritation
10	Irritation test	No Irritation
11	Acid value	1.4025
12	Saponification value	291.72



Fig. 3: Herbal Hair Oil.

4.3 Biological evaluation

Table 6: Anti fungal evaluation.

S. No.	Microorganisms	Control	50	100	150	Ketoconazole
1	Aspergillus niger	-	10	12	15	15

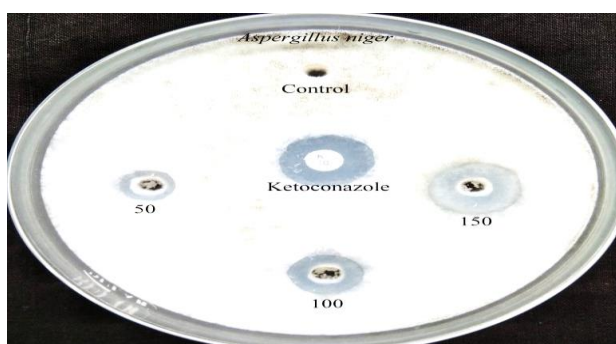


Fig. 4: Anti fungal activity.

4.4 Label preparation



Fig. 5: Herbal hair oil label.

5. DISCUSSION

The results obtained for the evaluation tests are under the specified limits. Colour is dark brown and the oil has pleasant odour. The results obtained for physical parameters like specific gravity, P^H , acid value, Saponification value are according to the standard values. In biological evaluation, it is tested on human skin and it did not produce any inflammation, allergy or erythemic reactions.

6. CONCLUSION

The utilization of herbal hair oil in the cosmetics enhanced many folds in personal hygiene and health care system. Herbal oil is one of the most well-recognized

hair treatments. The use of different herbal materials which is having different benefits with good combination will give the great effect for hair. The formulation was proven to be safe for human use. The formulated hair oil will help in maintaining good growth of hair, not only that it also provides turning grey hair to black, protects from dandruff, reduces stress etc. It provides various essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. Formulation was done and evaluated by means of various parameters like pH, organoleptic properties (color, odor, sensitivity, sedimentation) acid value, viscosity, specific gravity, and stability test. At last, it

can be concluded that the herbal hair oil formulations have significant quality.

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