



**INTERNATIONAL JOURNAL OF  
PHARMACEUTICAL SCIENCES**  
[ISSN: 0975-4725; CODEN(USA):IJPS00]  
Journal Homepage: <https://www.ijpsjournal.com>



## Research Article

# Formulation And Evaluation Of Polyherbal Hair Oil

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### ARTICLE INFO

Received: 23 April 2024

Accepted: 27 April 2024

Published: 28 April 2024

#### Keywords:

Hair fall, Polyherbal hair oil, Herbs, physical parameters.

#### DOI:

10.5281/zenodo.11080829

### ABSTRACT

#### Objective:

The goal of this study is to formulate and evaluate polyherbal hair oil for hair fall treatment.

#### Methods:

The study involves the preparation of polyherbal hair oil using herbs like amla, hibiscus, brahmi, methi, bringraj, neem leaves, and curry leaves. Its evaluation for an increase in hair growth activity and physical parameters were also evaluated like viscosity, refractive index, specific gravity, pH, acid value, saponification value, etc., and were compared with some synthetic marketed formulations. To find out the efficacy of testing herbal hair oil over simple Coconut Oil (purified) to reduce hair falls.

#### Results:

The results obtained for the evaluation tests are under the specified limits. The color is pale green and the oil has a pleasant odor. The results obtained for physical parameters like specific gravity, PH, acid value, and Saponification value are according to the standard values. In biological evaluation, it was tested on human skin and it did not produce any inflammation, allergy, or erythemic reactions.

#### Conclusion:

The formulated polyherbal hair oil was evaluated for physical and biological evaluation parameters and the values obtained were under required limits.

### INTRODUCTION

Hair is an epidermal derivative which is one of the vital parts increasing the overall Elegance of the body. Hair fall, dandruff, lice, spilt ends, and grey hair are a few problems involved with Hair faced by humans. To overcome these, the human takes

many measures by applying many Cosmetics. Hair oil is one of them used to solve almost all of these problems [1]. Herbal cosmetics are in high demand due to the increasing interest of mankind in Them because they are more effective with nil or fewer side effects, easily available ingredients, etc. Hair

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



care cosmetics are now added with herbs and they are well-recognised compared with Synthetic ones. Herbal hair oil is preferred and is used in many ailments of hair. They promote Hair growth, improve the elegance of hair, and prevent hair fall. Hair oil not only promotes hair Growth it also provides necessary moisture to the scalp rendering beautiful hair. Hair oils are the hair care preparations used for the prevention and treatment of baldness or other ailments, and aggression of hair [1]. They also promote the luxurious growth of hairs. Hair oil containing herbal drugs is used as a hair tonic. Hair care products are categorized into two main categories, hair tonics and hair grooming aids [2]. These are the extracts of medicinal plants in an oil base. A plethora of herbs have been employed for hair treatments. A few of these herbs are amla, henna, neem, methi, lemon, tulsi, brahmi, shikakai, reetha, liquorice root, musk root, mahabhringraj, jantamasi, chitraka, marigold, hibiscus, nutmeg, parsley, rosemary, thyme. The synthetic drug, minoxidil is a potent vasodilator and appears safe for long-term treatment [3]. After five years of use of 2 and 3% topical minoxidil, the improvement has been shown to peak at one year with a slow decline in regrowth over subsequent years. Long-term treatment with local side effects may be a problem with continuing use of minoxidil lotion [4]. Based on a market survey carried out on crude drugs used presently for herbal hair oils gives us a clue for the selection of drugs for hair oil [5]. Hence the present study aimed to evaluate the hair growth activity of herbal formulations, which includes oil extract of all mentioned drugs in various concentrations. To justify the traditional claims nowadays multi-ingredient hair oils are prepared and tested for their hair growth activity. Amla is rich in vitamin C, tannins, and minerals such as phosphorus, iron, and calcium which provide nutrition to hair and also cause darkening of hair. Hibiscus consists of calcium, phosphorus, iron, vitamin B1, riboflavin, niacin, and vitamin C,

used to stimulate thicker hair growth and prevent premature graying of hair. Brahmi contains alkaloids which enhance protein kinase activity. Methi contains high protein fodder which supplies required protein nutrition to hair. There are various methods available for the preparation of hair oils direct boiling method, paste method, and cloth method [6,7].

### **Methods used for the preparation of herbal hair oil:**

The coconut oil is blended with various drugs that have medicinal activity then it is termed as hair oil. It is prepared by the following mentioned processes [6,7].

#### **a. Cloth method:**

The dried drug was weighed and tied in a muslin cloth. This cloth was then hung in a coconut oil base, with continuous boiling, and stirring, and finally, the oil was filtered.

#### **b. Paste Method:**

The paste method was used where fresh fruit or pulp or the desired part of the plants were converted into paste with very little amount of water and kept overnight After this the wetted drug was mixed in coconut oil base and boiled with continuous stirring at a constant temperature, until the water droplets in oil stop knocking and the drug has completely extracted in the oil. The Oil was then filtered through a muslin cloth.

#### **c. Direct Boiling Method:**

The crude drugs were powdered, weighed, and directly boiled in coconut oil with continuous stirring and heating until the drug had completely extracted in the oil base. The procedure followed for the preparation of polyherbal hair tonic

## **MATERIAL AND METHODS**

### **a. Collection of crude drugs:**

Crude drugs of Neem, Hibiscus, Eclipta, Amla, aloe vera, methi, camphor, and curry leaves, were collected from the local area.

### **a. Drying of crude drugs:**



Crude drugs were dried under shade and proper aeration was provided to hasten the drying process. Drying under shade will retain the active constituents. Hence shade drying is preferred over artificial drying.

**b. Mixing and blending of dried crude drugs:**

The dried crude drugs were made into coarse powder by using a mixer. Later on, all these coarsely powdered drugs are passed through mesh number 80. Thus, obtained powders are blended individually to get a uniform mixture.

**c. Formulating herbal hair oil:**

Pure coconut oil extracted from *Cocos nucifera* is used. Initially, the oil is heated under a low flame.

To this hot oil, crude drugs in required quantities were added by taking them in a muslin cloth. The crude drug mixture present in muslin cloth is dipped in hot oil. The process is continued by taking the cloth in and out of hot coconut oil under a low flame. Thus, the active ingredients of the crude drugs will get absorbed into the hot coconut oil. Later the hot oil is cooled and any traces of crude drug powders are removed by filtration process. Initially, the oil is brown. On standing of crude oil under a cool place for a week the color of the oil to pale green [8].

The composition of the formulation is shown in Table 1.

**Table 1: Composition Of Herbal Hair Oil**

Sr. No	Ingredients	F1	F2	F3
1	Hibiscus	2gm	1gm	0.5gm
2	Aloe vera	2gm	1gm	0.5gm
3	Bringraj	2gm	1gm	0.5gm
4	Methi	2gm	1gm	0.5gm
5	Curry Leaves	2gm	1gm	0.5gm
6	Amla	2gm	1gm	0.5gm
7	Neem	2gm	1gm	0.5gm
8	Camphor	2gm	1gm	0.5gm
9	Coconut Oil	50ml	50ml	50ml

**d. Packing of polyherbal hair oil:**

The oil has a pleasant smell with rejuvenating activity for hair growth. The prepared hair oil is completely obtained from natural drugs so it has no side effects and has promising results. It is packed in amber-colored bottles and sealed tightly. Then the bottles are sealed in air-tight bottles.

**e. Storage of polyherbal hair oil:**

The sealed bottles are stored under cool conditions. This keeps the oil stable for a longer period without undergoing rancidity or saponification [9].

**EVALUATION**

**1. Organoleptic Properties:**

Colour and odour, were determined manually.

**2. Specific Gravity:**

Specific gravity or relative density is the ratio of the density of a substance to the density of a given reference material [10].

The following formula is used to determine specific gravity:

$$\text{Specific gravity} = \frac{\text{density of sample}}{\text{density of the same volume of water.}}$$

The specific gravity of prepared oil was determined using a pycnometer or specific gravity bottle. Determine and record the weight of the empty, clean, and dry pycnometer, W. Place 10g of oil sample taken in the pycnometer. Determine and record the weight of the pycnometer containing water and record it as WA. Dry the apparatus and place 10g of oil sample in the pycnometer. Determine and record the weight of the pycnometer containing the oil, WO [11].

### 3. pH:

The pH of the herbal oil was detected using a PH meter. pH of the herbal oil was detected using a pH meter. Glass and reference electrodes are connected to appropriate terminals at the rear panel. Set the temperature compensation knob to the temperature of the solution. Place the electrodes in buffer 7. Press the red switch on the front panel to read. Adjust the control knob to read pH 7 in the display. Bring the read switch back to standby mode. Remove the electrodes from the buffer 7. Wash them and place them in buffer 4 and 9.2. Confirm the display reading same as that of the buffer solution used. Rinse the electrodes with distilled water. Place the oil sample, dip the electrodes, and read the pH.

### 4. Acid Value:

The acid value is the number of mg of potassium hydroxide required to neutralize the free fatty acids in 1 g of the fat.

To measure the acid value of polyherbal hair oil, 10 ml of oil was added with 25 ml of ethanol, and 25 ml of ether Phenolphthalein was added as an indicator and titrated 0.1M potassium hydroxide solution.

### 5. Saponification Value:

The saponification value indicates the average molecular weight of a fat or oil. The saponification value may be defined as the number of milligrams of potassium hydroxide required to neutralize the fatty acids obtained by complete hydrolysis of one gram of oil or fat [12]. To measure the saponification value of polyherbal hair oil, a 2g sample of oil was accurately weighed and transferred into a 250ml iodine flask. 25ml of 0.5M alcoholic potassium hydroxide was added and boiled under reflux in a water bath for 30 minutes. Phenolphthalein was added to the indicator and titrated against 0.5M HCL. Similarly, the blank was performed without the sample.

### 6. Viscosity:

The drag caused by the relative motion of the fluid and a surface is a measure of the viscosity. A viscometer (also called a viscosimeter) is an instrument used to measure the viscosity of Polyherbal hair oil [13]. Viscosity was determined using an Ostwald viscometer. Rinse the viscometer with water and place it in position in a water bath by carefully clamping one limb. Check that it is vertical using a plumb line. Introduce exactly 20 ml of water into the bulb with a syringe or pipette. Leave for 5 minutes to equilibrate, then either apply positive pressure to the wide limb or gentle suction to the other limb until the meniscus rises above the upper graduation mark. Release the pressure and measure the time for the liquid to flow between the two graduation marks. Repeat the experiment with oil until the flow times agree within 0.2S. Calculate the average flow time. Calculate the relative viscosities ( $t_1/t_0$ ) using the values from the curves.

### 7. Refractive Index:

A refractometer measures the extent to which light is bent (i.e. refracted) when it moves from air into a sample and is typically used to determine the index of refraction (aka refractive index or  $n$ ) of a liquid sample. It was determined using a refractometer. firstly, turn on the light. Source choose oil sample; Water is used first to calibrate the instrument. Turn the refractometer scale knob to get a clear interface between the illuminated and dark regions. Read the index of refraction using the telescope scale. The temperature of the sample can be varied by using the slider. Repeat the experiment with oil and study the refractive index with temperature and wavelength.

### 8. Irritancy test/Patch test (swelling redness irritation):

The prepared herbal oil was analyzed for a primary skin irritation test. Oil was applied to a patch of skin on hand. The patch was kept under

observation for 24 hours to note any type of skin reaction [13].

**9. Stability test (at room temp and 35° C):**

The herbal oil was stored for a month at normal temperature in the room to notice the amendment in its color, odor, texture, and appearance

**RESULT**

The herbal hair tonic was prepared and the following results were obtained.

**Color:**

Greenish brown

**Odor:**

Characteristic odor

**Specific gravity:**

Specific gravity for polyherbal hair oil was done and it was found to be 0.9149.

**pH:**

The pH of the herbal oil was detected using a pH meter. And the measured pH was 6.1.

**Acid values:**

The acid value of hair oil was found to be 1.62.

**Saponification value:**

The obtained saponification value for polyherbal hair oil is 255.52.

**Viscosity:**

The viscosity of polyherbal oil was determined using an Ostwald viscometer. The observed value of viscosity is 1.09.

**Refractive Index:**

Refractive index of the oil is 1.674

**Irritation study:**

The prepared polyherbal hair oil is analyzed for a skin irritation test. The formulation does not show any irritation or skin reactions.

**Stability:**

the formulated polyherbal hair oil was stable when stored for one month.

**Table 2: Evaluation Parameters and Observation**

Sr. No	Parameter	Observations
1	Color	Greenish brown
2	Odor	Characteristic
3	Specific gravity	0.9149
4	pH	6.1
5	Acid value	1.62
6	Saponification value	255.52
7	Viscosity	1.09
8	Refractive index	1.674
9	Irritation study	No irritation
10	Stability	Stable

**DISCUSSION**

The polyherbal hair oil formulation was formulated with the optimized formula and evaluated for various parameters like color, viscosity, specific gravity, pH, acid value and saponification value, and refractive index. The prepared formulation is green to greenish-black in color with pH by human skin neutral to slightly acidic. The results obtained for physical parameters like specific gravity, PH, acid value, and Saponification value are similar to the

similarly marketed found to be preparations. Among all three formulations, F3 was found to be effective in all preparations and showed promising results in qualitative, and quantitative studies over standard oil.

**ACKNOWLEDGEMENT**

it is our privilege to express our heartfelt thanks to all those who have contributed directly or indirectly to the success of this project work. However, it is certain that debt, which we owe to our guide, cannot be expressed within these lines.

Still, it is our pleasant duty to acknowledge our deepest sense of gratitude to Mr. Ravindra G. Gaikwad. His invaluable & consistent guidance appreciation and timely suggestions always stimulated us to pursue the investigation with great interest. We are truly indebted to Dr. S. S. Patil Principal, Ashokrao Mane College of Pharmacy, Peth-Vadgaon, for providing facilities throughout our project work. We must place on record a very special thanks to all teaching and non-teaching staff for extending their kind and helping hand throughout our B. Pharm We cannot forget the dedication & sacrifice given by our beloved Parents and brothers. Because of their love, great support, patience, blessings, and faith in us and our abilities have made the journey easy and enjoyable which otherwise would seem impossible. Last but not least we thank ALMIGHTY for blessing us and giving us strength and courage to overcome difficulties in life... Thankful I ever remain.

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**HOW TO CITE:** Namita Sagvekar, Aishwarya Kocharekar, Gauri Patki, Swapnali Gawas, Formulation And Evaluation Of Polyherbal Hair Oil, *Int. J. of Pharm. Sci.*, 2024, Vol 2, Issue 4, 1241-1246. <https://doi.org/10.5281/zenodo.11080829>

