



## **Preparation and Evaluation of Anti-Dandruff Hair Oil Using Various Herbs**

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### **ABSTRACT**

*Herbal formulation has gained a notable position from ancient time. Nowadays, it is popular to use herbal preparation as it gives effective results without any harmful side effects. Herbal preparation has been remarkably used for its safety and efficacy. Hair loss as well as hair damage is major concern in young generation. The objective of the study is to formulate and evaluate anti-dandruff hair oil using various herbs namely Neem (*Azadirachta indica* A. Juss), Black pepper (*Piper nigrum*), Aloe Vera (*Aloe barbadensis* miller), Hibiscus leaves (*Hibiscus rosa-sinensis* L.), tulsi leaves (*Ocimum sanctum* L.), fenugreek seeds, bhringraj powder, curry leaves, menthol, orange peels, lavender oil. The coconut oil was used as base oil which make an effective anti-dandruff formulation with smooth and shiny hairs, also provide conditioning and promotes hair growth. The formulated shampoo was subjected to evaluation parameters like visual inspection, pH, viscosity, antidandruff test and stability studies, etc. The major goal of the present study is to formulate and evaluate anti-dandruff hair oil for treating various hair issues.*

**Keywords:** Anti-dandruff hair oil, Ayurvedic oil, *Malassezia furfur*, Antimicrobial Activity, Polyherbal formulation, keratolytic agent.

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### **INTRODUCTION**

Hair being protective and essential part of body, it is very crucial to treat problems related to them. Many young people suffer from hair related problem like hair loss, dandruff and many treatments are available in market. Hair loss occurs due to excess exposure of hair to chemicals, dandruff, disease state of scalp as well as decrease blood flow. There are two types of dandruff: i) Dry dandruff- yeast like fungus causes this dry type of dandruff, ii) Oily dandruff- it is due to excess formation of sebum on scalp of hair [1]. Hence to stimulate hair growth and for anti-dandruff activity it is important to develop novel formulation. Hair care products are used to maintain hair strength and make them healthy [2]. Plant and herbal material based products act as very important tool to treat human disease and also used as cosmetics [3]. Herbal hair oil is formulation obtained from natural sources and using oil base to treat hair related problem. Primary function is to keep hair healthy and good looking.

Herbal hair oil is known for improving hair health and scalp health, also used to treat dry scalp and dry hair problems [4]. Herbal hair oil act as good hair growth promoter by providing important nutrient material to hair and scalp for good hair growth [4]. Due to stress and tension hair are becoming old early and gets easily detached from scalp often observed in adult after age 20, nowadays it has become major hair related problem, so putting light on to this issue herbal hair oil is designed and formulated. The main problem associated to hair are dandruff, dry hair, loss of hair is overcome with subsequent use of herbal hair oil [5].

### **MATERIAL AND METHODS**

#### **Collection and storage of malassezia furfur**

The yeast like fungus was obtained by scraping dandruff from scalp with use of cotton swab. Cotton was dipped in sterile water and placed in refrigerator for further studies. Streak plate method was used for formation of culture plates of micro-organism and incubated for 2 days. The growth of micro-organism was observed and identification test were performed to confirm the organism.

### In-vitro identification of micro-organism

#### 1) Morphological test

On clean glass slide, micro-organism obtained was smeared and methylene blue was added to slide. Kept the slide for 5 mins and then washed with distilled water. The glass slide was observed under microscope.

#### 2) Biochemical test (catalase test)

In test tube micro-organism was taken and 3% of hydrogen peroxide was added. If bubbling occurs, it indicates release of oxygen from H<sub>2</sub>O<sub>2</sub>.

**A) Sample collection of herbal ingredients** Fresh leaves were collected from local market, cleaned with distilled water and dried. Powdered herb is passed through sieve no. 120 to get uniform particle size.

**B) Formulation of herbal anti-dandruff hair oil** All the ingredients were weighed accurately using digital weight balance (Table no. 1). Weighed ingredients were taken and boiled in coconut oil (used as base) for 15 -20 minutes till extract become dark green brown. Then the whole oil extract is filtered using muslin cloth. To this filtrate remaining coconut oil is used to make up volume up to 60 ml. 2-3 drops of lavender oil is added as flavouring agent. Prepared product was stored in bottle and labelled.

**TABLE NO. 1: Formulation of herbal hair oil-**

Sr. No.	Name of Drug	Botanical Name	Family	Plant Part	Qty. taken	Main Use
1)	Tulsi	<i>Ocimum sanctum L.</i>	Lamiaceae	Fresh Leaves	3 gm	Antifungal/ Antibacterial agent
2)	Hibiscus	<i>Hibiscus rosa-sinensis L.</i>	Malvaceae	Fresh Leaves	1 gm	Antifungal/ Antibacterial agent
3)	Neem	<i>Azadirachta indica A. Juss</i>	Meliaceae	Fresh Leaves	2 gm	Antifungal/ Antibacterial
4)	Shikakai	<i>Acacia concinna Linn</i>	Leguminosae	Leaves	3 gm	Nourish follicles
5)	Coconut oil	<i>Cocos nucifera (L.)</i>	Arecaceae	Fruit	25 ml (qs)	Oil base
6)	Almond oil	<i>Prunus dulcis</i>	Rosaceae	Seeds	5 ml	Oil base
7)	Fenugreek	<i>Trigonella foenum-graecum L.</i>	Fabaceae	Seeds	2 gm	Restore shine
8)	Bhringraj	<i>Eclipta alba (L.) Hassk.</i>	Asteraceae	Powder of Leaves	5 gm	Antifungal/ Antibacterial agent
9)	Curry Leaves	<i>Murraya koenigii Linn. Sprengal</i>	Rutaceae	Fresh Leaves	5 gm	Antifungal/ Antibacterial agent
10)	Menthol	<i>Mentha piperita</i>	Lamiaceae	Fresh leaves extract	2 ml	Perfume
11)	Black pepper	<i>Piper nigrum</i>	Piperaceae	Fruit	1 gm	Antidandruff
12)	Lemon peel	<i>Citrus limon (L.) Burm</i>	Rutaceae	Fresh Ripe Fruit Juice	1 gm	Preservative, antifungal
13)	Aloe Vera	<i>Aloe barbadensis miller</i>	Liliaceae	Latex of Leaves	20 gm	Soothing agent

### EVALUATION PARAMETER FOR ANTI-DANDRUFF HAIR OIL

**Organoleptic properties:** Physical evaluations for colour, odour, physical state, and solubility were determined.

**Consistency/ Grittiness:** Take 1 -2 drops of formulated herbal anti-dandruff hair oil and then rub with fingers. If particles are felt then formulation is gritty in nature. Good formulation shows a non-gritty texture.

**Skin irritancy test:** Prepared herbal anti-dandruff hair oil is applied on the surface of the skin for 5-10 minutes. Any inflammation or redness occurred is noted [6,7].

**Sensitivity test:** Herbal hair oil applied on hand of area 1 cm<sup>2</sup> and observed for any erythema of skin surface. [8]

**Viscosity:** Viscosity is a quantity which expresses the value of internal friction in fluid, measured using a Brookfield viscometer [9].

**Determination of pH:** pH of formulated herbal hair oil was checked using calibrated pH meter [10].

**Acid value:** 10 ml of oil sample was measured and dissolved in 50 ml ethanol. Add 2-3 drops of phenolphthalein solution as an indicator. Titrate it with 0.1 molar KOH solution. Colour changes from colourless to pink. Note the reading [11, 12].

**Specific gravity:** specific gravity for formulated herbal hair oil was done by using a specific gravity bottle [13].

**Microbial contamination test:** It is the vital test for detection of the ability of the preparation if it is capable of having antidandruff properties, for this test weigh accurately 4.5 gm of agar powder and 1.96 gm of nutrient broth to 150 ml distilled water. Boil for 10-20 min, keep for autoclave at 121 degrees Celsius till 15 min to make it aseptic, Petri plate should be disinfected by putting them in a hot air oven for 20 minutes. Make 3 plates, 1<sup>st</sup> plate there is agar, 2<sup>nd</sup> plate there is nutrient agar and microorganism collected by cotton running on scalp containing dandruff. In the last plate, there is agar and microorganism in which well is made with the help of cork and herbal anti-dandruff oil is added to it. Incubate for 24 hrs, observe zone of inhibition in last Petri plate and record [14-16].



Figure No. 1: Anti-dandruff Polyherbal hair oil

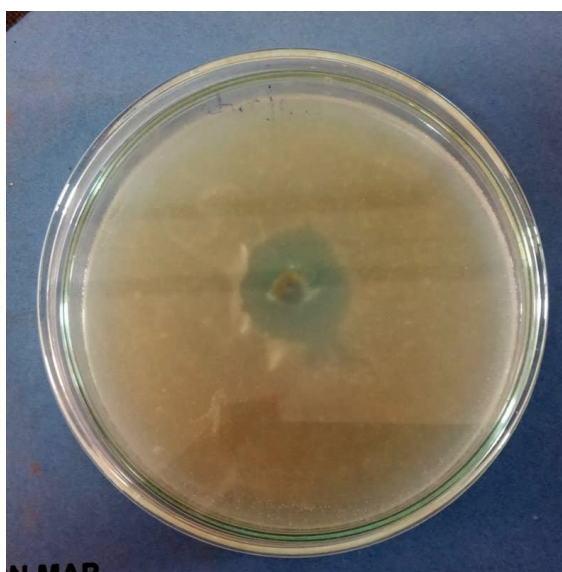


Figure No. 2: Anti-microbial contamination test

## RESULT AND DISCUSSION

### Identification of malassezia furfur

**Morphological identification:** because of staining by stain, the blue-colored bottle-shaped structure of the cells is seen under a microscope.

**Biological identification:** The catalase test shows active bubbling in presence of test fungus, confirming positive results for the test. The bubbling caused due to releasing of O<sub>2</sub> from oxide. Thus the pathogen confirmed as Malassezia furfur

### EVALUATION PARAMETER FOR ANTI-DANDRUFF HAIR OIL

Formulated anti-dandruff herbal hair oil was found to be safe and effective as it complies with tests and was found to be non-irritant. Physical evaluations were made and were satisfactory (Table no. 2). Formulation is non-gritty and pH was found to be 6.14 which is compatible with the skin. The rheological properties were evaluated and the result was found to be 3 cps.

Herbal hair oil was evaluated for specific gravity and acid value which showed results of 1.32 and 0.45 respectively. The microbial contamination test was performed to check the ability of hair oil against micro-organisms found on the scalp like Malassezia furfur. The potential zone of inhibition was obtained and hence we can say that the formulation is safe, effective, and has anti-dandruff activity.

**Table 2: Evaluation Parameter for Anti-Dandruff Hair Oil**

Sr. No.	Parameters	Observation
1)	Colour	Greenish-brown
2)	Odour	Aromatic
3)	Appearance	Good
4)	Consistency	Non-gritty
5)	Irritancy	Non -irritant
6)	Viscosity	3 centipoise
7)	pH	6.14
8)	Acid value	0.45
9)	Specific gravity	1.32
10)	Zone of inhibition	25mm

All the parameters were checked and found to be satisfactory.

### CONCLUSION

The formulated herbal anti-dandruff hair oil was tested and all parameters were found to be satisfactory. As all ingredients used were herbal no side effect was shown and hence we can conclude the preparation is safe and effective for all types of hair. The formulation was non-gritty and non-irritating to the skin was observed. It was found that herbal hair oil was able to moisturize hair and scalp and also reduce hair fall. An antimicrobial test was performed in order to confirm anti-dandruff activity against *Malassezia furfur* and adequate results were obtained for the same.

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