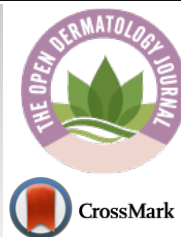




# The Open Dermatology Journal

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## RESEARCH ARTICLE

### Preparation & Assessment of Poly-Herbal Anti-Dandruff Formulation

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#### Abstract:

#### Background:

Dandruff is a major problem of hair, which cannot be fully cured with the aid of chemicals. An attempt has been made to prepare a poly-herbal anti-dandruff hair care formulation and it is standardized to ensure its stability and quality aspects.

#### Objective:

The present work is oriented at the synthesis of herbal anti-dandruff hair formulation and the estimation of its various aspects for its valuability.

#### Materials and Methods:

The herbal preparation was prepared in the laboratory, on the basis of decided proportion, with the help of all the herbal contents. The pack was gauged for its various parameters.

#### Results:

The results were concluded to be sufficiently ample for the assessment of herbal formulation. The findings of different aspects vindicated the worth of the formulation.

#### Conclusion:

Herbal hair formulation has been formulated and assessed using the various aspects. It serves as a good alternate, devoid of any side effects. The results can be unified while evolving the pharmacopoeial standards.

**Keywords:** Herbal, Hair, Dandruff, Evaluation, Drugs, Chemicals.

#### Article History

Received: February 10, 2020

Revised: May 14, 2020

Accepted: May 17, 2020

## 1. INTRODUCTION

Dandruff is becoming the major and common problem of hair nowadays. It is the condition that produces flakes on scalp skin, followed by itching on skin. Dandruff is a non-inflammatory and chronic condition which is characterised in the most common dermatological skin problem, related to the scalp that is eminent by an excessive range of scalp tissue being affected [1]. The main cause of dandruff is not visible properly, but there are multiple factors such as, oily scalp, poor hygiene leading to fungal infection and it appears more often if the hair is not washed for a week. The use of dirty water and at poor families where anti-dandruff tools are expensive, it occurs frequently. A yeast-like fungus, *Malassezia*, feeds on oils on the scalps of most adults, dry skin, sensitivity to hair care pro-

ducts or contact dermatitis, other skin conditions, such as psoriasis and eczema are also the causative factors behind dandruff. It causes embarrassment in public places and hair loss [2]. A high level of sebum occurs by dandruff on the skin in various areas. Its symptoms are redness, flakes, and itching of the scalp, hair breakage, and unexpected hair colour and skin discoloration [3].

The main two ways of dandruff treatment are using chemical-based anti-dandruff shampoo and herbal based anti-dandruff shampoo [4]. There are various shampoos and scalp preparations available in the market, against dandruff, which contain chemicals and which may cause certain side effects. The plant includes several compounds, which behave in a biological way against dandruff causing agents. Synthetic shampoos can cause side effects, like itching, irritation, loss of hair, nausea, headache and increased scaling [5]. The usage of

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these synthetics causes adverse effects, skin irritation, allergy, hair breakage, skin discoloration, unexpected hair colour and cancer [6]. In the Indian medicine system, various plants are used in the dandruff treatment as Brahmi, Bengal gram, Reetha, Hibiscus, Liquorice, Marigold [7, 8].

These formulations are herbal based, with viable substitutes for synthetic drugs. Over the last few decades, natural products have shown a tremendous increase in herb based cosmetics. There are many herbal shampoos available nowadays, containing herbal ingredients like essential oils and extracts of plants. Many plants have beneficial effects on hair [9]. Traditional medicine in India is endowed with magical and religious beliefs and the World Health Organisation is engaged in setting up definite guidelines for appraisal of traditional medicine of major effectiveness [10, 11].

Medicinal plants are rich in antioxidants, known to treat different diseases. The antioxidant potential is tested at various levels [12]. Preparations used in hair care are available in the form of creams, dyes, pomades, powders, tonics, *etc.* [13]. Hence, the knowledge from Ayurveda and herbals will be enhanced by information on the evidence-basis of these plants [14]. Drugs from the herb resources are quickly accessible, cheap, safe, efficient and rarely have side effects [15]. The need for herb based natural medicines is vastly increasing due to the lack of side effects and natural goodness [16, 17]. The underlying research deals with the preparation and assessment of Poly-herbal anti-dandruff formulation containing the goodness of Amla, Bhringraj, Reetha, Hibiscus, Neem, Tulsi and Ginger.

## 2. METHODS

### 2.1. Ingredients

#### 2.1.1. Amla

Amla, known as Indian gooseberry, is an ample source of vitamin C. It is full of many health benefits. Powdered Amla is used as an essential of hair tonics, required to enhance hair growth and improve hair pigmentation [18]. It gives power to the roots, takes care of the colour, and improves luster. Amla oil application to the roots of hair improves hair growth and color [19]. The very popular use is to decrease baldness and hair loss. This quality is due to the tannin contents as tannic acid, ellagic acid, gallic acid, iron and antioxidant material that freezes free radical damage to hair follicles, caused by dandruff [20].

#### 2.1.2. Bhringraj

Bhringraj or false daisy is a medicinal herb that promotes hair growth. It is a popular ayurvedic ingredient used for hair growth [21]. It helps to empower blood circulation to the scalp by stimulating and triggering hair growth, which has been lost due to any cause, probably, dandruff, *etc.* It also prevents scalp problems, caused by dandruff and irritation, in order to make

sure that hair growth remains unaffected [22].

#### 2.1.3. Reetha

Reetha shows cooling effects and acts as an excellent cleanser on the skin. Soapnuts prevent the scalp from drying and retain the softness of the skin. The mixture of soapnuts and chickpea when applied on the skin gives gentler effects on the skin [23]. It makes skin soft and tender. It is also used in removing flakes of cells on the scalp [24].

#### 2.1.4. Hibiscus

Hibiscus or 'gudhal' is the most beneficial ingredient for hair [25]. It is used for the growth of hair, its regrowth, and hair loss. Hibiscus carries amino acids, Vitamin A, C and alpha hydroxyl acids along with other nutrients that are highly beneficial for hair and scalp. They keep scalp healthy and minimize the chances of dandruff from hair [26].

#### 2.1.5. Neem

Neem helps to clean the scalp. It clears the clogged pores and improves hair growth. The regenerative properties are extremely essential for the treatment of dandruff [27]. It is endowed with antiseptic and healing properties and it can be used for a variety of hair problems [28]. Dandruff can be removed by using neem leaves as a rinse. The most common neem uses are in our hair care rituals. As per Ayurveda, amla, reetha, neem, shikakai are herbs needed for healthy locks, enhanced hair growth, decrease hair fall and make the hair voluminous [29].

#### 2.1.6. Tulsi

Tulsi or holy basil is used for religious works from ages.

It helps to look after the blood circulation and keeps the scalp calm, thereby reducing irritation and dandruff, hence promotes hair growth [30]. It is used in the form of a paste, which keeps dandruff away and the scalp roots clean [31].

#### 2.1.7. Ginger

Ginger is a great hair conditioner, loaded with minerals and essential oils, making hair more manageable, softer and shinier [32]. It acts as a utility relief for itchy scalp, dry and dandruff. It carries natural anti-inflammatory and antiseptic properties to keep scalp healthy and clean [33].

**Table 1. Composition of Anti-dandruff hair pack.**

S No	Name	Biological Name	Quantity
1.	Amla	<i>Phyllanthus Emblica</i>	50gm
2.	Bhringraj	<i>Eclipta prostrate</i>	25gm
3.	Neem	<i>Azadirachta indica</i>	15gm
4.	Reetha	<i>Sapindus mukorossi</i>	25gm
5.	Hibiscus	<i>Hibiscus rosa-Sinensis</i>	50gm
6.	Tulsi(Holy Basil)	<i>Ocimum sanctum</i>	25gm
7.	Ginger	<i>Zingiber Officinale</i>	10gm

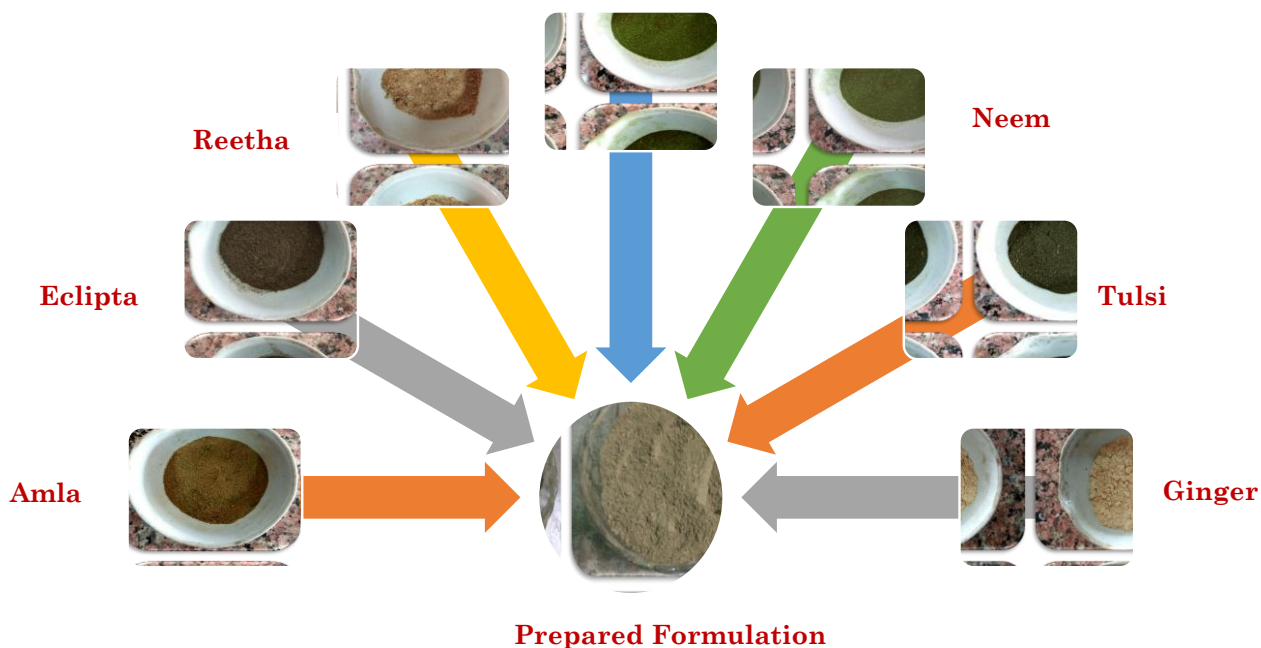


Fig. (1). Prepared Formulation.

**2.1.8. Quantity of the Constituents**

Amla and Hibiscus were taken in the maximum amount, as they have proven hair nourishment property, as on dandruff treatment, the scalp becomes dry, so it is essential to nourish it. Bhringraj, Reetha, Tulsi were taken 25 grams each, as they improve blood circulation and are capable of revitalizing the hair follicles and facilitating hair growth. Reetha and tulsi are anti-bacterial and anti-fungal in nature. Neem and Ginger contain pungent active principles, in concentrated forms, therefore taken in minimal amounts.

**2.1.9. Formulation**

- The parts of herbs were collected and dried in the sunlight.
- The dried herbs were powdered and weighed accurately.
- All the materials, as shown in Table 1 and Fig. (1), were mixed homogenously in the mortar pestle.

**2.1.10. Novelty of Formulation**

- It is in the form of a pack.
- No artificial additive has been incorporated.
- The constituents are easily accessible, so they can be prepared easily at home.
- It can be made freshly before use.

**2.1.11. Application of Anti-dandruff Hair Care Formulation**

The pack or coarse pack should be applied on a weekly basis on hair, as a semi-solid paste in lukewarm water, as it increases the efficiency of the constituents, with required

consistency. It should be spread evenly on the hair with the help of a brush, from roots to the hair tip. It should be left for 30 minutes for full drying. Then it should be removed by treating with plain water.

**2.1.12. Use**

- As an Anti-Dandruff Hair Pack
- Nourishes Hair
- Stops graying of hair
- Reduces hair loss
- Induces shine and luster to the hair

After the formulation of the anti-dandruff hair pack, the evaluation is done as follows;

**2.1.13. Organoleptic Evaluation**

By utilizing sensory organs like eyes or nose, the examination of the formulation is performed under this evaluation, and it includes macroscopic characteristics of the drug or product, such as colour, odour, and taste. The texture and appearance are also included under macroscopic features, as elaborated in Table 2.

**Table 2. Features and Observations of Ingredients.**

S.No.	Organoleptic features	Observation
1.	Color	Greenish Brown
2.	Odor	Characteristic
3.	Texture	Fine
4.	Appearance	Coarse Powder

### 2.1.14. Physicochemical Studies

The physicochemical studies of the formulations were performed as per Table 3, to analyse the physical and chemical aspects, including pH of the formulation, ash value, and loss on drying (Moisture content).

**Table 3. Physicochemical Studies.**

S.No.	Physicochemical Test	Observation
1.	pH	6.8
2.	LOD (Loss on Drying)	1.26% w/w
3.	Ash Value	3.0% w/w

### 2.1.15. Phytochemical Evaluation

Various tests were performed, as mentioned in Table 4, to identify the phytoconstituents present in the products and their effect is shown on the body. Every plant exhibits certain phytochemical properties, which show a number of beneficial effects.

**Table 4. Phytochemical Evaluation.**

S.No.	Test	Purpose for Detection	Result
1.	Molisch's Test	Presence of Carbohydrate	Positive
2.	Fehling's Test	Presence of Carbohydrate	Positive
3.	Hager's Test	Presence of Alkaloid	Positive
4.	Mayer's Test	Presence of Alkaloid	Positive
5.	Volatile Oil Test	Presence of Volatile Oil	Negative
6.	Biuret Test	Presence of Proteins	Negative
7.	Foam Test	Presence of Saponin	Positive

### 2.1.16. Rheological Evaluation

In Rheological evaluation, the physical properties of the powdered formulation are examined, as shown in Table 5. Powder Rheology is the determination of flowability of powders. In this, bulk density, tapped density, angle of repose, Hausner's ratio, Carr's Index are measured.

**Table 5. Rheological Evaluation.**

1.	Bulk Density	0.45
2.	Tapped Density	0.5
3.	Angle of Repose	41.7°
4.	Carr's Index	10
5.	Hausner's Ratio	1.11

### 2.1.17. Patch Test

In this, the tiny amount of moistened formulation is applied on the surface of the hand and the effects have been observed for irritancy and itchiness caused by formulation (Table 6).

**Table 6. Patch Test.**

1.	Swelling	Nil
2.	Redness	Nil
3.	Irritation	Nil

### 2.1.18. Stability Test

The powdered formulation was stored for some time under different temperatures (35°C and 40°C) and humidity

conditions, and the change in the physical properties was observed (Table 7).

**Table 7. Stability Test.**

1.	Change in Colour	Nil
2.	Change in Odour	Nil
3.	Change in pH	Nil
4.	Change in Texture	Nil
5.	Change in Smoothness	Nil

## 3. RESULTS AND DISCUSSION

The synthesized anti-dandruff herbal hair formulation is loaded with the goodness of natural herbs along with the active phyto-constituents. It nourishes hair mildly by acting as an anti-dandruff agent. It effectively removes excess oil from the scalp, which is the major root cause behind dandruff.

Amla supplies more nutrients and antioxidant content to nourish hair, also prevents free radical damage to hair follicles because of dandruff. Amla with its vitamin C, anti-inflammatory and anti-bacterial properties can stop dandruff formation.

Bhringraj prevents scalp issues as irritation due to dandruff, so that hair growth remains unhindered. It acts as an antioxidant to cleanse the scalp due to sebum deposition, opens blocked pores, kills bacteria and promotes hair growth. It conditions hair and also removes dandruff. It has antimicrobial and antifungal properties that can help reduce dandruff, which can help psoriasis or other skin irritations on the scalp. It is also said to improve circulation to the scalp.

Hibiscus carries amino acids, Vitamin A, C and alpha hydroxyl acids that are extremely nice for scalp and healthy scalp is a must for the removal of dandruff from hair. Hibiscus has astringent properties, which help reduce the oil gland secretions and excessive oil secretion of the scalp. This property of the flower helps cool and soothe scalp providing relief from itchy scalp and dandruff.

Neem treats clogged pores and increases hair growth. The anti-fungal properties of neem do wonders in fighting dandruff.

Tulsi reduces itchiness caused by dandruff and is an excellent anti-microbial plant.

Ginger is a treatment for itchy scalp caused mainly by dry scalp and dandruff. It helps to keep scalp healthy and clean. It fights skin and scalp infections due to its anti-bacterial or anti-microbial abilities. Ginger juice can restore health to the scalp and may even help in dealing with itchy scalp and dandruff.

Reetha improves blood circulation and is capable of revitalizing the hair follicles and facilitating hair growth, to cope with the air loss caused by dandruff.

Organoleptic evaluation signified that the pack is characteristic smelled, coarsely powdered. Physicochemical parameters revealed that the loss on drying was as minimal as 1.26%. pH was found to be neutral as 6.69 to fit the requirements of different hair types. Ash value was found to be optimum, visualizing the presence of minerals in nominal quantities. It confirmed the presence of main phytoconstituents,

which provide full nourishment for the scalp as well as hair. Irritancy test was found to be negative for redness and swelling as the contents were used in their natural form, devoid of artificial additives. Rheological Evaluation is essential to check the flowability of the powdered formulations to make sure that it is not dense or compact so that it may absorb moisture, which will affect its stability. Its moisture content was also found to be very less. As the constituents used in the formulation have an established literature review, claiming them as an important part of home hair care remedy, and since this article deals only with the preparation and evaluation of the formulation, therefore, a future scope exists to prove its efficacy on different subjects. Stability tests performed signified the compatible nature of the formulation, for the observation of colour, odor, appearance, texture, and pH. The formulation is made with dried herbal ingredients, signifying few chances of the decomposition of the formulation, as there is a humid substance in either raw or finished form. The formulation was kept under observation for one month at room temperature to look for any visible changes in its color, odor, texture and appearance. The pH was also noticed. The formulation can be stored easily and is suitable to be used at any temperature, at any place in its stable form, since it is a natural herbal based formulation, with no harmful chemicals. However, the frequent use of it provides voluminous, smooth and dandruff free hair.

## CONCLUSION

A herbal hair pack treats dandruff from the hair in a very mild and gentle manner. The herbal based cosmetics are known for their non-toxic nature. It nourishes the skin of the scalp as well that as hair. It treats dandruff by removing excess oil from the scalp. Regular use of this pack leads to problem free, healthy and rich hair. Oily scalp and its poor hygiene cause dandruff in the hair. In this research, the effective properties of the herbal hair pack were disclosed and further studies are required to find out more values that can be added on by this hair pack. Natural remedies are majorly being used nowadays around the world with open hands, as they are safer with minimal adverse effects as compared to chemical based products. Herbal formulations are fulfilling the needs of the growing world market. It is an attempt to formulate the herbal hair pack containing the rich qualities of different crude plants, which are essential for the different aspects of hair care.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

## HUMAN AND ANIMAL RIGHTS

No humans/animals were used in this study that are the basis of this research.

## CONSENT FOR PUBLICATION

Not applicable.

## AVAILABILITY OF DATA AND MATERIAL

Not applicable.

## FUNDING

None.

## CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

## ACKNOWLEDGEMENTS

Declared none.

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