

## ALTERNATIVE HERBAL DRUGS USED FOR TREATING HAIR DISEASE

PUSHPENDRA KUMAR JAIN<sup>1\*</sup>, DEBAJYOTI DAS<sup>2</sup>, SINGHAI AK<sup>3</sup>

<sup>1</sup>Faculty of Pharmacy, Naraina Vidya Peeth Group of Institutions, Kanpur, Uttar Pradesh, India. <sup>2</sup>School of Pharmaceutical Sciences, SOA University, Bhubaneswar, Odisha, India. <sup>3</sup>Department of Pharmaceutical Sciences, Dr. HS Gour University, Sagar, Madhya Pradesh, India.  
Email: jainpk1443@gmail.com

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## ABSTRACT

**Objective:** The main objective of present study is to treat Alopecia. Alopecia areata is an unpredictable hair-loss condition. Alopecia is a dermatological disorder with psychosocial implications on patients with hair loss. Herbal systems of medicine have become increasingly popular in recent years. Medicinal plants have been used for the treatment of hair diseases since antiquity. Herbs such as turmeric, fenugreek, ginger, *Cyperus* (Nagarmotha), and holy basil are integral parts of ayurvedic formulations. *Cyperus rotundus* is a well-known ayurvedic herb with purported claims of hair growth promotion.

**Methods:** Extracts are prepared by separating the soluble matter from vegetable tissues by the application of a suitable solvent such as alcohol, water, or ether. The resultant liquid is concentrated by evaporation to obtain a liquid extract or concentrated almost to dryness to obtain the solid extract and its volatile oil. Hair formulation of *C. rotundus* belonging to family *Cyperaceae* in the form of herbal formulation (5% herbal cream and oil) was studied and it showed excellent hair growth activity with standard (2% minoxidil ethanolic solution) in Wister albino rats.

**Results:** Hair growth initiation time was significantly reduced to half on treatment with the oil, as compared to control animals. The hair growth-promoting effect was evaluated against the control, standard, and test animals at 0, 10, 15, and 20 days with the formulated hair oil and hair cream prepared from the volatile oil extracted from the *C. rotundus* and the significant hair growth was observed, and the growth was compared with the standard drug used 2% solution of minoxidil.

**Conclusion:** The results of treatment with oil were better than the positive control minoxidil 2% treatment. It holds the promise of potent herbal alternative for minoxidil.

**Keywords:** Alopecia areata, *Cyperus rotundus*, Hair growth, Extracts, Herbal creams, Hair oil, Hair formulation, Ayurvedic, *Cyperaceae*.

## INTRODUCTION

Hair loss is a dermatologic disorder, and the surge for discovering natural products with hair growth-promoting potential is continuous [1,2]. Hair loss or alopecia is a common patient complaint and a source of significant psychologic and physical distress [3]. Androgens are considered to be one of the most important causes for alopecia apart from various factors [4]. Natural products in the form of herbal formulations are available in the market and are used as hair tonic, hair growth promoter, hair conditioner, hair-cleansing agent, antidandruff agents, as well as for the treatment of alopecia and lice infection [5]. A number of herbal products have been acclaimed with hair growth-promoting activity [6]. The traditional system of medicine in India acclaims a number of herbal drugs for hair growth promotion. In our study, we have found that the herbal hair oil and herbal cream prepared from *Cyperus rotundus* are useful in treating "Indralupta" (i.e., loss of hair) [7, 8]. The present study was, therefore, undertaken to develop a formulation containing ethanolic extracts of these drugs in the form of herbal hair oil and herbal creams in varying ratios and evaluating them for their hair growth-initiating and hair growth-promoting activity.

Ayurveda has described hair diseases in three words:

1. Khalitya means loss of hairs
2. Palitya means premature hair graying
3. Indralupta means Alopecia areata, totalis, universalis [7,8].

Hair growth varies from person to person but on an average hair grows about 5-10 mm per month. Maximum growth of hairs takes place at the age of about 15-30 years [14]. It is also seen that hair growth is more

in summers as compared to winters. Scalp (skin on the head) consists of seven components. These are papilla of hairs, hair shaft, mouth of follicle, stratum granulosum, sebaceous gland, and oil duct [4].

**Hair cycle and its mechanism**

Hair loss problem is of great concern to both males and females. If you have thinning hair, first find out the cause. Normal shedding of hair is natural. To understand what is normal hair fall, we must know the basics of hair growth cycles [Fig. 4]. The follicular life cycle can be divided into 3 phases.

1. Anagen: It is the phase of active growth
2. Catagen: It is the phase of follicular regression
3. Telogen: It is the resting phase.

A hair follicle goes through three stages during its life span. The first is the period of growth which lasts for about 2-8 years. This is followed by resting period which may vary from 2 to 4 months. Then comes the shedding stage of the hair when new hair follicles push out of the scalp as new hair growth cycle begins and the old ones fall off to make space for new hair growth. We usually lose 50-100 hair in this normal hair shedding process [7].

**Hair loss**

Nowadays, hair loss is a common disease which has really created chaos around the world. Recent data shows the tendency of hair fall has increased in the past two decades.

**Causes of hair loss/diseases**

- Deficiency of useful minerals and vitamins in body
- Mental and emotional stress

- Prolonged illness
- Hormonal imbalance is commonly seen in hyperthyroidism, imbalance in androgen, and estrogen
- Usually after childbirth due to hormonal imbalance
- Certain medications such as blood thinners, vitamin A if taken in excess amount, noncontraceptive pills, antidepressant drugs, and medicines used in chemotherapy for treating cancer patients
- Certain infections that can promote hair loss, for example, fungal infection on scalp
- Diseases such as diabetes may also be a precipitating factor in hair loss
- Poor blood circulation or excess blood loss
- Poor nutrition
- Lack of sleep and lifestyle disorder
- Hereditary factors.

## METHODS

### Collection and identification of plant

Nagarmotha/Motha, traditional name for *C. rotundus*, was collected from Chirgoan Jhansi District in Uttar Pradesh, and the specimen sample was prepared and authenticated from NBRI Lucknow vide Specimen No NBRI SOP 202 dated 23.07.2010. The sample was cleaned and shade dried, crushed into coarse powder for the pharmacognostic studies and extraction purpose.

Ethanol extraction of the drug was done using Soxhlet apparatus as well as extraction of volatile oil was also carried out using Clevenger apparatus. The resultant ethanolic extract was concentrated and total removal of moisture is carried out in order to prepare hair cream and hair oils in various concentrations.

*Cyperus* contains sesquiterpenes, and they are identified as  $\alpha$ -cyperone,  $\beta$ -selinene, cyperene, cyperotundone, patchoulone, sugeonol, kobusone, and isokobusone. Moreover, it also contains other terpenes such as the commonly occurring plant component pinene (a monoterpene) and several derivatives of the sesquiterpenes such as cyperol, isocyperol, and cyperone [9]. These active constituents are found in the volatile oil of *Cyperus* rhizomes, which makes up only about 0.5-1% of the dried rhizome.

### Pharmacognostic studies

The ethanolic extract was subjected to preliminary phytochemical investigation for the detection of the following metabolites:[10]

- Alkaloids
- Carbohydrates
- Glycosides
- Phenolic compounds
- Flavonoids
- Protein and free amino acids
- Saponins
- Sterols

### Preparation of hair formulation

The hair formulations of HF1, HF2, and HF3 formulations were prepared using different % of *C. rotundus* oil, and similarly the HF4, HF5, and HF6 formulations were also prepared using different concentrations of ethanolic extract of drug using coconut oil as base in both formulations.

### Primary skin irritation test

The institute has been cleared for the said biological evaluation by the Animal Ethics Committee (Letter No.1122/ac/07/CPCSEA). Six healthy male rats, weighing 200-250 g, were selected for the study. Each rat was caged individually; food and water was provided to all these six rats during the test period of 24 hrs prior to the test. The hair from the back of each rat of 1 cm<sup>2</sup> was shaved and the sites were cleaned with surgical spirit. A quantity of 1 mL (5% w/w) of the formulations HF1, HF2, HF3, HF4, HF5, and HF6 was applied over the respective test sites. The test sites were observed for erythema and edema for 72 hrs after application of the prepared formulations [12].

### Hair growth initiation test

Quantitative modified model for the study of hair growth initiation was followed. The albino rats were divided into eight groups (three animals in each group) as group A, B, C, D, E, F, G, and H, respectively, and 2 cm<sup>2</sup> area of the surface of each rat was shaved to remove all the hairs. Group A was treated with coconut oil (base) and kept as controlled group, Group B was with minoxidil 2% solution and kept as standard or reference group, and Group C, D, E, F, G, and H, respectively, served as test groups. Group C was treated with HF1, Group D was treated with HF2, Group E was treated with HF3, Group F was treated with HF4, Group G was treated with HF5, and Group H was treated with HF6, respectively. The hair growth initiation pattern was observed and recorded. The treatment was continued for 30 days, and the hair growth activity was recorded at following stages: Hair growth activity was recorded at 0 day, 10 days, 20 days, and 30 days.

## RESULTS AND CONCLUSION

The results of general characteristics, physical, and chemical evaluation are summarized in Tables 1-4. The hair growth studies finally prove that formulation HF2 has excellent hair growth-promoting activity by an enlargement of follicular size and a prolongation of the anagen phase. When compared to the standard, it holds the promise of potent herbal alternative for minoxidil. [Figs. 1-3].

**Table 1: Organoleptic properties of *Cyperus rotundus* rhizome**

S. no.	Organoleptic character	<i>Cyperus</i> rhizome
1	Type	Simple
2	Color	Dark brown (externally) Creamish yellow (internally)
3	Odor	Characteristic and pleasant
4	Taste	Slightly pungent and astringent
5	Shape	Elongated, broadly ovoid, and trigonous
6	Size	10-20 cm long and 0.8-2.5 cm wide
7	Surface	Slight tuberous at base

**Table 2: Primary phytochemical screening of *Cyperus rotundus* rhizome extract**

S. no.	Plant constituent/ chemical constituent	Present/ absent
1	Alkaloids	+
2	Glycoside	+
3	Carbohydrates	+
4	Proteins and amino acids	+
5	Tannins	+
6	Flavonoids	+
7	Acids	+
8	Saponin	-
9	Phenol	+
10	Lipids	+

+: Present, -: Absent

**Table 3: Mean hair length in mm at the initiation stage**

S. no.	Group	Formulation	Mean hair length in mm
1	A	Control	2
2	B	Standard (2% minoxidil)	3.5
3	C	HF1	3
4	D	HF2	3.4
5	E	HF3	3.0
6	F	HF4	3.2
7	G	HF5	2.9
8	H	HF6	3.0



Fig. 1: Hair growth result at 0 day



Fig. 3: Hair growth result at 20<sup>th</sup> day using HF2 formulation



Fig. 2: Hair growth initiation result at 6 days using HF2 formulation

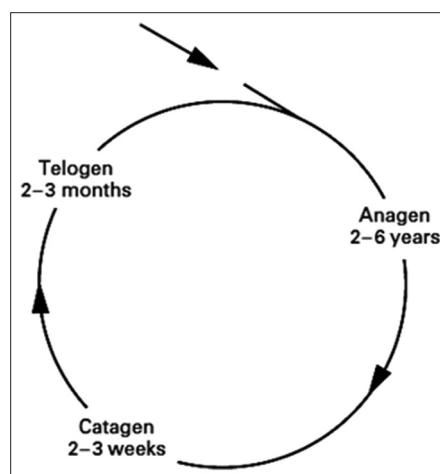


Fig. 4: Cycle of scalp-hair growth

Table 4: Mean hair length in mm at 20 days

S. no.	Group	Formulation	Mean hair length in mm
1	A	Control	8.2
2	B	Standard (2% minoxidil)	10.1
3	C	HF1	8.1
4	D	HF2	9.7
5	E	HF3	7.9
6	F	HF4	7.8
7	G	HF5	8.3
8	H	HF6	8.5

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