



Development And Characterization Of Hair Growth Stimulating Activity Of Herbal Oil

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Abstract: -

The aim of present study was to involves the Development and Characterization of hair growth stimulating activity of herbal oil using plant materials. The prepared herbal hair oil evaluated different parameters within the acceptable limits. Such as physical appearance, pH, viscosity, acid value, saponification value, sedimentation, skin irritation, volunteer studies. Various herbal extracts, including Black Seed Oil (30%) (100 ml), Coconut Oil (200 ml), Castor Oil (150 ml) Peppermint Oil (20 ml) Vitamin E Oil (20 ml) was prepared and incorporated into Amla (Indian Gooseberry) (50 ml), Bhringraj (50 ml), Chhota Gokhru (30 ml) Brahmi (30 ml) Fenugreek (30 ml), Ashwagandha (20 ml), Green Tea (30 ml). Phytochemical screening, organoleptic evaluation, chemical analysis (acid value, saponification value), viscosity, sensitivity studies, and in-vivo hair growth activity were conducted. Organoleptic evaluation revealed characteristic odors and colors across formulations. Chemical analysis showed acceptable values for acid value (2.23 mg KOH/g), saponification value (165.9 mg KOH/g), viscosity (39.17 cp.) and. Prepared hair oil is applied on human volunteer to study hair growth activity (volunteer study) demonstrated to significant enhance hair compared to controls. The development of herbal hair oils exhibited promising physicochemical properties, efficacy, safety, for human being and hair growth promotion in human models. These findings suggest their potential as natural remedies for hair care. Herbal hair oils formulated in this study show significant potential for promoting and increasing hair growth and addressing hair-related concerns. The significant efficacy across multiple parameters among the formulations. Further research and volunteer study are warranted to validate their efficacy and safety for human use.

Keyword: - Herbal hair oil, Amla, Stimulating Hair growth, Coconut Oil, Ashwagandha. Skin Irritation.

Introduction: -

Hair is essential to human existence. In India, the custom involves mixing different medications that promote hair growth with hair oils. The preparations for hair oil are included to treat split ends, dandruff and other issues. Now a days hair loss and dandruff in hair is major problems associated with hair in both women and men's. Therefore, it has great importance to develop the new theories for the treatment of hair problems. Along with the good shampoo and conditioner, great hair oil completes hair care. ⁽⁴⁾ The main purpose of hair oil preparations is to cool the scalp in order to promote luscious hair development in both men and women. ⁽¹⁾ Making an herbal hair oil using multiple herbal powders, Herbal juices and base oils involves a Decoction process that extracts the beneficial properties of the herbs into the oil. Here's a step-by-step procedure to create an effective herbal hair oil for hair loss, hair regrowth & powerful antidandruff. Hair follicles are highly sensitive

structures that can be damaged by various factors, including environmental pollutants, UV radiation and inflammation. ⁽⁸⁾ Herbal medicines derived from plants are believed to be safe in the treatment of various diseases. ⁽¹¹⁾

Types of Herbal Hair Oil Available in Market

1. Amla hair oil
2. Coconut hair oil
3. Bhringraj hair oil
4. Jasmine hair oil
5. Brahmi hair oil
6. Cantharidin hair oil
7. Onion hair oil

Hair oil is applied to the hair as a cosmetic, conditioner, styling aid, restorative, or tonic. Hair oils have been used for many different purposes such as hair growth, health, dryness, scalp, or fixing damaged hair. Various forms of hair oils can be applied such as natural hair oils which include traditional hair oils like coconut, castor, or almond oil. Humans produce natural hair oil called sebum from glands around each follicle. ⁽²⁾ Diagnosis of hair loss conditions involves a comprehensive assessment, including a thorough medical history and physical examination. Dermatologists utilize advanced techniques such as dermatoscopy and trichoscopy to identify specific findings. ⁽³⁾ The objective of this study is to design, formulate and evaluate an herbal hair oil aimed at nourishing and fortifying hair, soothing the scalp, and stimulating hair growth. Following formulation, the herbal hair oil underwent comprehensive evaluation, considering factors including Physical appearance, Acid Value, pH, saponification value.

Benefits of Herbal Hair Oil: -

- The hair oil helps prevent hair loss and reduces frizz. The ends of the human hair need special care, and vegetable oil help to pamper the hair throughout the diet.
- Gives shine to hair.
- It helps to relieve stress.
- Regular use of hair oils helps to cure the problem of premature grey hair.

Ideal characteristics of Hair oil: -

- It must impart pleasant smell to the hair.
- It should not have any side effects.
- It must be easily removed on irrigating with the water.
- It should give luster to the hair.

Symptoms of hair follicle conditions? ⁽¹⁰⁾

- Hair loss, thinning hair or limited hair growth.
- Pimples, fluid-filled bumps or blemishes on your skin
- Swelling (inflammation). • An itchy rash.
- A wound that isn't healing, has a yellow crust or leaks a white to yellow fluid (Infection).

The HF cycle comprises four major phases: -

Anagen (growth), catagen (regression, telogen (rest), and exogen (shedding) are the four stages of life. According to anatomical location, nutritional and hormonal status, age, and species, each phase lasts a different amount of time. For instance, the first "test" hair shaft in mice develops very late, around 17 days after birth, and is therefore frequently mistaken for the "first anagen". In their lifetime, scalp follicles go through 10 to 30 cycles. The location of white adipose tissue, which forms "dermal cones" around pilosebaceous units, is hypothesized to be related to the cycle of human HF.⁽⁵⁾

They are used to provide shine and excellent conditioning and they also help to reduce frizz. Natural hair oils are the hair care products which are rich in Vitamins, Minerals and Fatty acids which are the vital.⁽⁶⁾ Considering the above-mentioned fact, the presented study has been prepared to formulate and evaluate an effective herbal hair oil for the promotion of hair growth and perform a comparative study with commercially available hair formulations.⁽⁷⁾

There are three phases of hair growth cycle, these are as⁽⁹⁾

1. Anagen (Growth phase)
2. Catagen (Involution)
3. Telogen (Resting phase)

HAIR GROWTH CYCLE

Anagen Catagen Telogen Early Anagen

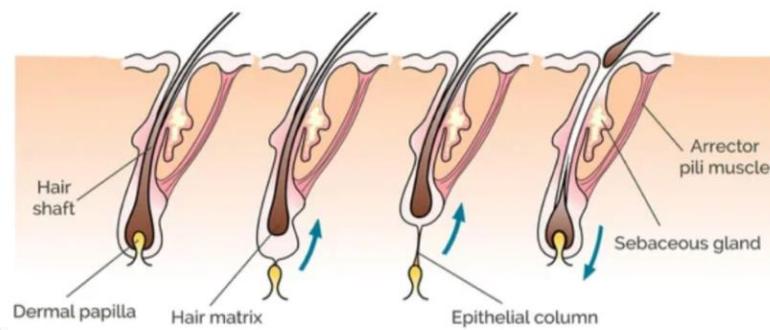


Fig No.1: - Human Hair Growth Cycle

HAIR ANATOMY

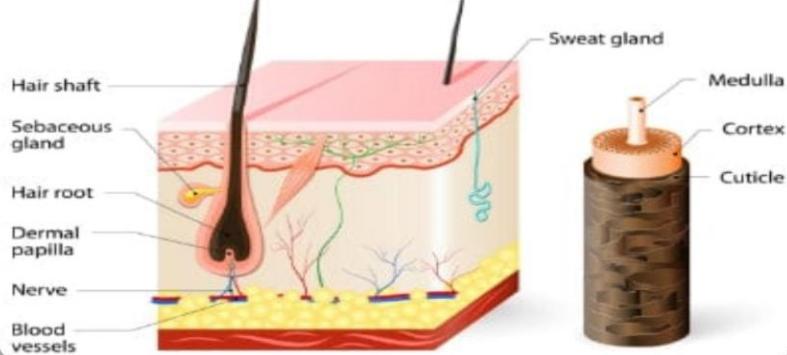


Fig No.2: - Hair Anatomy

Table No. 1: - Herbal Ingredients and Their Medicinal Uses

Sr. No.	Ingredient	Medicinal Uses
1.	Amla (Indian Gooseberry)	Promotes hair growth, strengthens hair.
2.	Bhringraj	Prevents hair loss, supports regrowth.
3.	Chhota Gokhru	Supports hair growth and strengthens hair.
4.	Brahmi	Soothes scalp, prevents dandruff.
5.	Fenugreek	Reduces dandruff, promotes thicker hair.
6.	Ashwagandha	Reduces hair loss & nourishes hair follicles (by depleting cortisol).
7.	Green Tea	Promotes hair growth by catechins that reduce Dihydrotestosterone (DHT) causing hair loss.
8.	Black Seed Oil	Boosts hair growth, prevents hair fall.
9.	Coconut Oil	Deeply nourishing, great for all hair types.
10.	Castor Oil	Thickens hair, promotes growth.
11.	Peppermint Oil	Stimulates hair growth, increases follicular activity.
12.	Vitamin E Oil	Acts as a preservative and for added nourishment.

The following are the various hair care preparations

1. Detergents: Eg: soap nut, shikekai, reetha.
2. Conditioners: Eg: henna, Amla, hibiscus,
3. Anti-dandruff: Eg: soap nut, shikekai, lemon, thyme, aloe vera. ⁽¹⁸⁾

Aim of study: -

1. This study's primary objective is to create and assess a polyherbal hair oil with a variety of herbs for several uses.
2. To create the herbal hair oil.
3. To lessen the impact of chemical formulation adverse effects.
4. To make hair's texture better. ⁽¹²⁾

Hair oils are the hair care formulations applied for treatment of hair disorders such as baldness, aggression of hair discoloring of hair, hair falling, dryness of hair. Herbal hair oils are formulated with herbal extracts in oil base. ⁽¹⁶⁾ There are various methods available for the preparation of hair oils direct boiling method, paste method and cloth method. After preparation second main step is evaluation of preparation. The next final step is determination of its therapeutic efficacy. ⁽²⁰⁾

Material and Method: -**Material: -**

All the materials used in formulation of herbal hair oil purpose. It was Collected from in our college SSJIPER Jamner.

Method of Preparation: -

- 1) Measure Ingredients: Weigh all the ingredients in given formula accurately
- 1) Warm the base oils (such as Black seed oil, Castor oil) using a double boiler on low heat (~50-60°C).
- 2) Add herbal extracts (such as amla, bringhraj, Brahmi, fenugreek, ashwagandha, green tea) and infuse for 3–4 hours (do not overheat). Strain the oil and let it cool to ~40°C.
- 2) Gently mix bioactive additives (such as coffee, vitamin E-oil) into the oil.
- 4) Add essential oils (such as Peppermint Oil) last and blend thoroughly.

Formulation Batch for Preparation of Herbal Hair Oil: -**Table No. 2: - Formulation Batch for Preparation of Herbal Hair Oil**

Ingredient	Quantity (1000 ml)
Amla (Indian Gooseberry)	50 ml
Bhringraj	50 ml
Chhota Gokhru	30 ml
Brahmi	30 ml
Fenugreek	30 ml
Ashwagandha	20 ml
Green Tea	30 ml
Black Seed Oil (30%)	100 ml
Coconut Oil	200 ml
Castor Oil	150 ml
Peppermint Oil	20 ml
Vitamin E Oil	20 ml

(Note: - Finally make up the volume up to 1000 ml with the help of Coconut Oil)

Evaluation Parameters: -**Physical appearance: - ^(1,14)**

To check the state, color and odor of herbal oil.

Table No. 3: - Physical Parameters

Sr. No.	Parameters	Result
1.	State	Liquid form
2.	Color	Dark Brown
3.	Odor	Aromatic odor

Determination of pH: - ^(2,6,14,19)

The pH of hair oil was determined using a digital pH meter.

Acid Value: - ^(2,15,8)

Preparation of 0.1 molar solutions. Weighed 0.56 g KOH pellets and dissolved in 100 mL of distilled water and stirred continuously. The prepared 0.1 molar KOH solution was filled in the burette. Preparation of sample 10 mL oil was measured and dissolved in 50 mL of 1:1 ethanol and ether mixture and shacked vigorously. 1 mL of phenolphthalein solution was then added and titrated with 0.1 molar KOH solutions.

Saponification Value: - ^(4,11,13)

Accurately weigh 1 ml of oil into a 250 ml of conical flask and 10 ml of ethanol: ether mixture (2:1) was added. To this flask, 25 ml of 0.5 N alcoholic KOH was added. Keep the flask for 30 min and the flask was cooled. The cooled solution was titrated against 0.5 N HCl using phenolphthalein as indicator. Similarly, the blank titration was performed without taking oil (sample). The amount of KOH in mg used was calculated.

$$\text{Saponification value} = \frac{B-S}{N/W}$$

Were,

S = ml of KOH required to neutralize the substance

B = ml of KOH required for blank

N= Normality of standard Hydrochloric acid.

W = Weight of the sample taken for the test (g).

Sedimentation: - ^(1,17)

Keep the whole preparation aside for overnight and check for sedimentation occur in oil.

Viscosity: - ^(6,7,11,20)

The viscosity of the herbs was determined with a Ostwald viscometer and Take the specific gravity bottle, wash it with distilled water, dry in an oven for 15 minutes, cool, cap and weigh (a) Now fill the same specific gravity bottle with the sample and cap and weigh again (b) Determine the weight of the sample per milli liter by subtracting the mass(ba).Susceptibility test: 1 cm of prepared plant cells was applied to the skin of the hands and exposed to sunlight for 4-5min.

Skin Irritation Test: - ^(5,13)

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

Volunteer study: - ^(8,19)

1 volunteer with hair loss, dandruff and other hair problems participated in the study. The volunteer was asked to use the oil once or twice daily according to their usage habits. They were directed to apply the oil on the scalp and massage with fingertips using a circular motion so that the oil reach the root of the hair and covers the entire scalp area. Additionally, they were advised not to wash the hair immediately or to comb vigorously after

applying the oil. Moreover, they were not permitted to use any other oil or hair loss supplements during the course of the study. Data was collected regarding the use of this oil at the time points of 1 months. **Result and Discussion: -**

In respect of physicochemical properties, the prepared formulation was yellowish-Brown in color with pH (6.8) in accordance with human skin pH (6.6-6.8) which was neutral to slightly acidic.

Table No. 4: - Evaluation Parameters of Herbal Hair Oil

Evaluation Parameter	Obtained Result
Physical Appearance	No
State	Liquid Form
Color	Dark Brown
Order	Aromatic odor
Determination of pH	6.6-6.8
Acid Value	2.23
Saponification Value	165.9
Sedimentation	No
Viscosity	39.17
skin irritation	No skin irritation
Volunteer Study	Increased Growth of Hair After One Months

Discussion: -

Herbal hair oil was Dark brown in appearance. Herbal Hair oil had appropriate pH (6.6-6.8), Viscosity (39.17), acid value (2.23), saponification value (165.9) as well as good hair growth. The composition give very good effect there is no any kind of irritation to skin. Combination of effective herb could be used to increased hair growth activity. It provides numerous essential nutrients required to maintain function of sebaceous gland and promote natural and increase hair growth.

Conclusion: -

The used of herbal hair oil in the cosmetic increases many folds in personal hygiene and health care system. Hair is is one of the most recognized hair treatments. The use of different herbal materials which is having different benefits with good combination will give the great effect for enhance hair growth activity. It provides numerous essential nutrients required to maintain normal function of sebaceous gland and promote natural hair growth. The use of different benefits with good combination will give the great effect for hair. The herbal extracts and constituents chosen for formulation of hair oil were reported to have hair growth, it is use in treatment of alopecia areata scalps blood circulation. Thickening of hair, reduces excess illness, anti-dandruff and shiny hair growth. The formulation was proven to be safe for human use. Hair oil formulation with good values of evaluation parameters show similar beneficial in maintaining good hair growth of the hair turning grey hairs to black providing protection from dandruff and results lustrous looking hairs. Formulation was done and evaluated by means of various parameters like pH greenish brown organoleptic properties (color, odor, sedimentation) acid value, viscosity, saponification value, skin irritation test, volunteer study. At last, it can be concluded that the herbal oil formulation has significant quality. The formulated herbal oil provides many nourishing values to hair such as vitamins, minerals and essential oils.

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