

Formulation and Evaluation of Ayurvedic Hair Serum for Dandruff.

Tushar S Bagmare, Shivam W Bhise, Neha B Bharate, Prof. Mayuri .R. Dhande

Prerna Institute of Pharmacy College, Parbhani

bagmaretushar813@gmail.com

Abstract: Hair and scalp disorders such as dandruff, dryness, hair fall, and Microbial infections are common concerns affecting overall hair Health. The present study focuses on the formulation and Evaluation of a herbal hair serum using *Clitoria ternatea* and *Cyanthillium cinereum* for effective scalp nourishment. These Plants are known for their rich phytochemical profile, including Flavonoids, alkaloids, and phenolic compounds, which exhibit Antioxidant, antifungal, and antiinflammatory properties.

The hair serum was formulated using suitable excipients such as Natural oils, humectants, and stabilizers to ensure optimal Consistency, spreadability, and stability. The prepared Formulation was evaluated for various physicochemical Parameters including pH., viscosity, homogeneity, spreadability, And stability under different conditions. Additionally, biological Activities such as antifungal efficacy and scalp conditioning Effects were assessed..

Keywords: Hair, hair serum, hair growth, hair loss, hair care, cosmetics, herbal extract, *Clitoria Ternatea*, *Cyanthillium Cinereum*

I. INTRODUCTION

Hair is a protein-based filament that grows from follicles present in the skin, primarily composed of a structural protein called Keratin. It is one of the defining features of mammals and plays both biological and cosmetic roles.

Hair grows from hair follicles located in the dermis layer of the skin. These follicles are connected to sebaceous glands that produce oil (sebum), keeping hair moisturized.

Functions of Hair

Protection: Shields scalp from UV rays and external damage. Temperature regulation: Helps maintain body heat.

Sensory function: Hair follicles are sensitive to touch. Aesthetic role: Enhances appearance and identity.

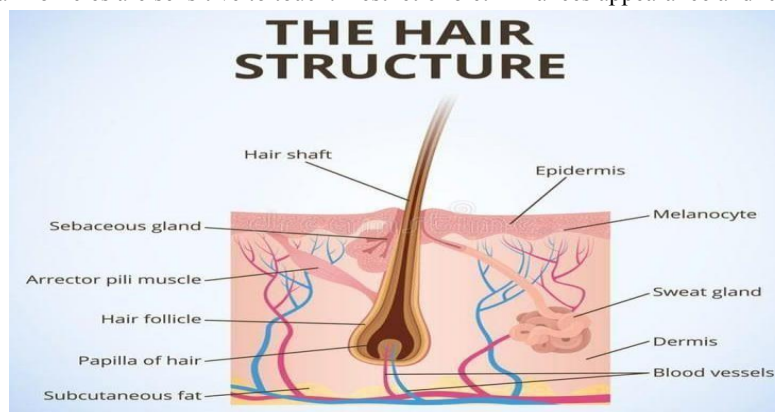


Fig no 1 :- The Hair Structure



Common Hair Problems

Hair fall, Dandruff, Split ends, Dryness and frizz, Scalp infections.

Maintaining a balanced diet, proper hygiene, and using suitable hair care products especially herbal formulations can help improve overall hair health.

Hair problems are a common concern worldwide, affecting people of all ages, genders, and ethnicities. One of the most prevalent issues is hair fall, which can result from stress, poor nutrition, hormonal imbalance, pollution, and genetic factors. A major cause of hair loss is Alopecia, a condition that leads to partial or complete loss of hair on the scalp or body.

HAIR LOSS AS A GLOBAL PROBLEM

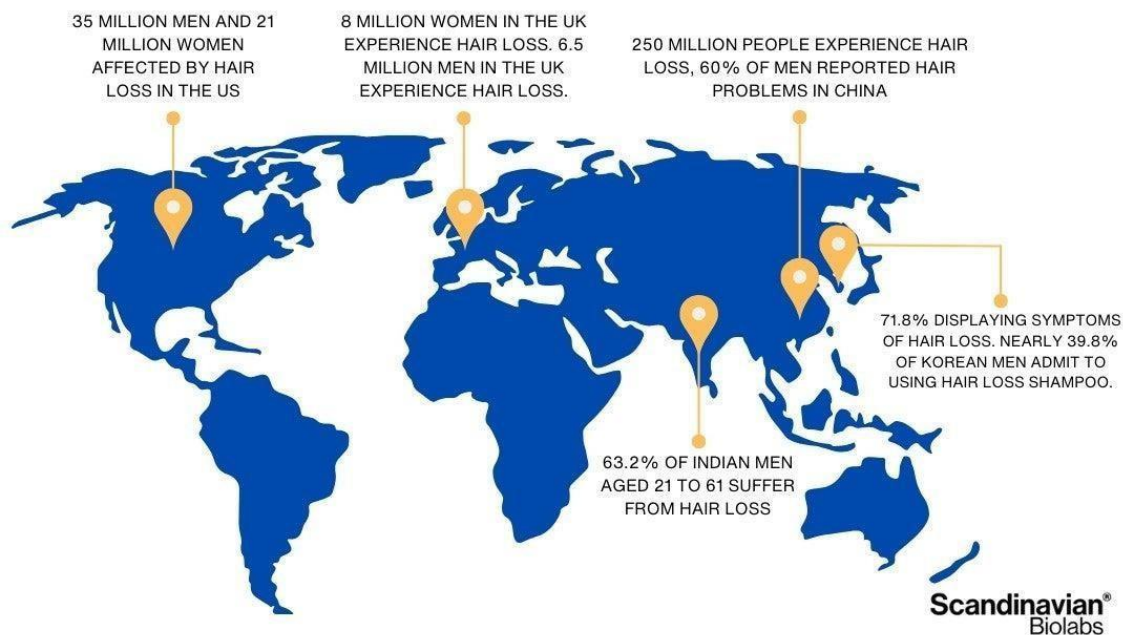


Fig no.2 Hair Loss

In recent years, there has been a global shift toward the use of herbal products and the adoption of a more natural lifestyle. Herbal cosmetics have gained significant popularity, especially in personal care applications, leading to a rapid increase in their demand worldwide. India, known for its rich heritage of medicinal plants, has played a major role in promoting herbal-based products on an international level.

The demand for herbal cosmetics continues to rise as consumers increasingly prefer natural alternatives over synthetic products. Traditional systems like Ayurveda have long utilized various herbs and plant materials for cosmetic purposes, focusing on both beautification and protection from environmental damage. One of the major advantages of herbal cosmetics is their minimal side effects on the human body.

The present study focuses on evaluating a combined hair serum called Biosea® Revive Serum (BRS), which contains multiple active ingredients for hair growth. The study includes laboratory tests to check safety and effectiveness, such as testing hair follicle cell growth, measuring reduction of harmful reactive oxygen species (ROS), and analyzing the effect on 5 α -reductase protein activity caused by DHT. Additionally, a clinical trial was conducted on 40 participants (20 males and 20 females) to study the serum's effectiveness in promoting hair growth.



II. LITERATURE REVIEW

1) Mrs. Neethu Vijayan [15-2025]

This study formulates a herbal hair serum using *Clitoria ternatea* and *Cyanthillium cinereum* to treat dandruff naturally. The plants were selected for their rich phytochemicals with antifungal, antioxidant, and scalp nourishing properties. Extracts were prepared by aqueous maceration and incorporated into a serum with suitable excipients. The formulation showed good physical properties and effective antifungal activity against *Candida albicans* (13mm inhibition zone). Overall, the serum is a lightweight, safe, and promising alternative to chemical dandruff treatments.

2) Ahriman et al. [2003]

Explores the Potential of *Clitoria Ternatea* In promoting hair Growth, both *in vivo* and *in vitro*. They conducted Experiments to evaluate the efficacy of the plant extract in Stimulating hair growth. The findings suggest that *Hibiscus Rosa-sinensis* Linn. Exhibits promising hair growth-Promoting properties, which could have implications for the Development of hair growth treatments.

3) Leny et al. [2022]

Present a study focused on the formulation of a Hair tonic using ethanol extract of Sea Hibiscus (*Hibiscus Tileaceus* L.) Leaves and its efficacy in promoting hair growth in Guinea pigs (*Cavia porcellus*). The research investigates the Potential of the formulated hair tonic as a treatment for hair Growth promotion. The findings of this study contribute to the Understanding of natural remedies for hair growth and could Have implications for the development of hair care products.

4) Shende et al. [2024]

Describe their work on the formulation and Evaluation of a herbal hair serum utilizing rosemary leaves. The Study likely explores the potential benefits of rosemary leaves in Promoting hair health and growth. The formulation and Evaluation process likely involved assessing the serum's Efficacy in enhancing hair texture, strength, and growth. This Research contributes to the growing body of knowledge on Herbal remedies for hair care and may offer insights into the Development of natural hair care products.

5) Rose et al. [2020]

Explore the potential hair growth Properties of a crude extract derived from *Hibiscus rosa-Sinensis* Linn. Their study likely investigates the efficacy of The extract in promoting hair growth through *in vitro* or *in Vivo* experiments. The findings of this research contribute to The understanding of natural remedies for hair growth and May have implications for the development of hair care Products derived from *Hibiscus rosa-sinensis* Linn.

6) Kalita et al. [2022]

Present a study focused on the Formulation and evaluation of a natural herbal hair dye gel Using *Lawsonia inermis* (henna leaves). The research likely Involves assessing the efficacy of the herbal hair dye in coloring hair as well as evaluating its safety through skin irritation studies conducted on albino rats.

7) Al-Snafi et al.[2018]

Provides a comprehensive review focusing on the chemical constituents, pharmacological effects, and therapeutic importance of *Hibiscus rosa-sinensis*.The review likely covers various aspects such as phytochemical composition, biological activities, and potential therapeutic applications of the plant. It serves as a valuable resource for understanding the pharmacological properties of *Hibiscus rosa-sinensis* and its potential uses in medicine and healthcare.

8) Missoum et al.[2018]

Presents an updated review Focusing on the phytochemistry and medicinal uses of *Hibiscus rosa sinensis*. The review likely provides an Overview of the plant's chemical composition, including its Active compounds, and discusses its various medicinal Applications. This review serves as a valuable resource for Researchers, herbalists, and healthcare practitioners interested In the therapeutic potential of *Hibiscus rosa sinensis* in Traditional and modern medicine.



III. AIM & OBJECTIVE

Aim :-

To formulate and evaluate a herbal hair serum using Clitoria ternatea And Cyanthillium cinereum for effective scalp nourishment and Improved hair health.

Objective:-

1. To formulate an Ayurvedic hair serum using natural herbal ingredients.
2. To utilize medicinal plants like Clitoria ternatea and Cyanthillium cinereum for promoting hair growth and scalp health.
3. To develop a safe and effective alternative to synthetic hair serums with minimal side effects.
4. To evaluate the formulation for physical parameters such as color, odor, and appearance.

Plant Profile

Clitoria Ternatea

Synonym:-

Butterfly pea, Blue pea, Aparajita, Shankpushpi.

Biological Source :-

The plant consists of dried flowers, doors, seeds, and leaves of Clitoria ternatea belonging to the family Fabaceae.

Geographical Distribution :-

Native to tropical Asia, Widely found in India , Shri Lanka, Southeast Asia, Africa and Australia.



Fig no.4 Clitoria Ternatea

Morphological Characteristics:-

Habit:- Perennial herbaceous climbing vine.

Leaves :- Pinnate compound leaves with 5-7 leaflets Green, Soft, and ovate.

Flowers :- Deep blue, purple, white, Funnel shaped, Solitary and axillary.

Fruit :- Flat pods containing 6-10 seeds. Seeds :- Oval, Smooth, and Brownish- black. Chemical Constituents:-

Flavonoids, Anthocyanins (Ternatins) ,Alkaloids ,Tannins ,Saponins, Glycosides ,Phenolic compounds, Proteins and peptides .



Mechanism Of Action :-

Antioxidant Activity, Improves Blood Circulation, Strengthening Hair Follicles, Anti-inflammatory Effect, Antimicrobial Activity .

Cyanthillium cinereum

Synonym:-

Vernonia cinerea L, Conyza cinerea L.

Biological Source:-

The plant consists of the whole plant of Cyanthillium Cinereum Belonging to the family Asteraceae.

Geographical Distribution:

Native to tropical Africa and Asia (India, Sri Lanka, Southeast Asia), Widely Naturalized in Australia, South America, and other Tropical regions.



Fig no.5 Cyanthillium cinereum

Morphological Characteristics:-

Small, erect annual herb, Height: 15–120 cm, Hairy stem.

Leaves:-Simple, alternate Shape: Ovate to lanceolate.

Chemical Constituents:-

Flavonoids, Alkaloids, Triterpenoids, Steroids (Phytosterols), Tannins, Saponins, Phenolic compound, Essential oils (trace amounts) .

Mechanism Of Action :-

Anti-inflammatory Effect, Antioxidant Action, Sebum Regulation, Follicle Nourishment and Strengthening, Cleansing and Detoxifying Effect, Anti Microbial Activity.

Method of extraction:-

• Preparation OF Clitoria Ternatea Flower Extract :-

1. Gathered and shade-dried for a Few months.
2. The fresh Clitoria ternatea flowers Were ground into a fine powder and combined with Distilled water in a particular
3. substrate solvent ratio [1:20 (w/v)] using a professional blender set to low Speed for 40 seconds.



4. For a predetermined amount Of time (60 minutes), the blended mixture was kept in a thermostatic water bath that was set to a Particular temperature (60°C).
5. Whatman filter Paper was then used to filter the mixture.
6. The Filtrate was gathered and kept at a cold Temperature.

• Prepration Of Cyanthillium Cinereum Plant Extract

1. The entire cyanthillium cinereum plant was gathered, shadeDried for a few months, and then ground into a fine powder.
2. The extraction solvent was water in a 100 mL beaker, 5 g of Cyanthillium cinereum powder was mixed with 50 mL of Water.
3. It was macerated for 35 minutes at 100°C in a hot air oven.
4. After three extractions, the mixture was passed through Whatman filter .
5. The filtrate was gathered and kept at a cold Temperature.

IV. MATERIAL AND METHOD

Sr No	INGREDIENTS	OFFICIAL FORMULA
1	Clitoria ternatea flower extract	10 ml
2	Cyanthillium cinereum plant extract	10 ml
3	Glycerin	1.5 ml
4	Gum Acacia	0.1 gm
5	Lavendor oil	0.3 ml
6	Almond oil	0.3 ml
7	Vitamin E	0.3 ml
8	Rose water	7.5 ml

Methodology

Procedure:-

- Preparation of Aqueous Phase: In a clean beaker, add the required amount Of rose water (about 70% of the total volume) and glycerine. Sprinkle Accacia gum Slowly while stirring continuously to avoid clumping. Continue Stirring about 10-15 minute until the gum is fully hydrated and Forms a Slightly thick solution.
- Addition of Active Extracts: Once the aqueous phase is ready, add the Clitoria ternatea Extract and Cyanthillium cinereum extract into the mixture. Stir Well to ensure uniform distribution of the extracts.
- Preparation of Oil Phase: In a separate container, mix almond oil with Vitamin E. Stir until Combined and clear to get oil phase. Stir well until the emulsifier Is fully incorporated into the oil.
- Emulsification: Slowly add the oil phase into the aqueous phase drop by drop While stirring continuously. Continue stirring until a uniform, Smooth emulsion is formed.
- Addition of Preservative: Add methyl paraben as a preservative and mix thoroughly.
- Final Mixing: Continue mixing the serum for a few more minutes To ensure all ingredients are well combined and the serum has a Smooth, uniform texture.

Evaluation Test

Chemical test of clitorea ternetea flower extract :

Experiment	Interference
Test for anthocyanins (Sulphuric acid Test) Mix 2ml of plant extract with 2 ml of 2NH ₂ SO ₄ then add a few ml of ammonia	Positive
Test for Phenolic acid (FeCl ₃) Add 1-2 drops of Ferric chloride solution to The	Positive



extract.	
Test for Alkaloids (Dragendorff's Test) 1 ml of Dragendorff's reagent were added to 2ml of extract.	Positive
Test for Saponins (Foam Test) to the plant extract add few drops of distilled water and shake well.	Positive

Chemical test for cynantheium cinnerium extract :-

Experiment	Inference
Test for terpenoids (Salkowski Test) Mix 5ml plant extract with 1 ml of chloroform and 3 ml sulfuric acid.	Positive
Test for flavonoids (Alkaline reagent test) add few drops of NaOH to 2 ml of extract.	Positive
Test for carbohydrates (Molisch's Test) To the sample solution add few drops of Molisch's reagent, then add few drops of concentrated Sulphuric acid along the side of the test tube.	Positive
Test for Phenolic acid (Litmus paper test) A piece of litmus paper is dipped into plant extract.	Positive
Dragendorff's Test 1 ml of Dragendorff's reagent were added to 2 ml plant extract	Positive

Evaluation Parameters

Visual Inspection For Appearance, Homogeneity Test, pH Test, Viscosity Measurement, Spreadability Test, Antifungal study, Stability Test.

V. RESULT

1. Physical Parameter

Parameter	Result
Colour	Light lavender
Odour	Pleasant
State	Slightly viscous

2. Homogeneity Test :-

Experiment	Result
Clarity test	Absence of black spot and white spot

3. Determination of pH :-

Experiment	Result
Digital pH meter	4.4

4. Viscosity Measurement:-

Using an oswald viscometer, the viscosity of the hair serum was measured and found to be 1250 cps, which is around the expected value.



5.Spreadability Test:-

The agar well diffusion method was used to investigate the antifungal activity against candida albicans. The microorganism's susceptibility to the chemical under test is shown by the size of the inhibitory zone. With a 13 mm zone of inhibition, hair serum containing clitoria ternatea and cyanthillium cinereum has antifungal efficacy against the candida. albicans fungus species. Concentrations, the formulation can be utilized to stop dandruff brought on by candida fungi.

Organism	Zone oc measurement (mm)
Candida species	13

7.Stability Testing :-

Parameter	Before 1 week	After 1 week
Colour	Light Ivender	Light Ivender
Odour	Pleasant	Pleasant
pH	4.4	4.4
Texture	Smooth	Smooth
Consistency	Slightly viscous	Slightly viscous

VI. DISCUSSION AND CONCLUSION

The herbal hair serum formulated with Clitoria ternatea (Butterfly Pea) and Cynanthelium cinnerium (Cinnamon) extracts showed promising results in Promoting hair health. Key findings: air Growth Promotion Clitoria ternatea Extract is rich in antioxidants and flavonoids, which may stimulate hair Follicles and promote growth.

The combination of Clitoria ternatea and cynanthelium cinnerium in a hair serum offers a natural, potentially effective solution for hair care. Further studies on human subjects are needed to validate efficacy. This study successfully formulated and Evaluated a natural hair serum using Clitoria Ternatea and Cyanthillium cinereum. The serum Exhibited effective antifungal activity and Satisfactory physical and chemical properties, Making it a promising alternative to synthetic Products. Future work will focus on clinical trials, Product optimization, and mark comparisons to Enhance its therapeutic potential.

REFERENCES

[1]. Assegaf TS, Jusuf NK, Pane YS, Rusda M, Darmani EH, Amin MM, Lubis RDS, Bachtiar A. Anti-dandruff effects of Butterfly pea flowers (Clitoria Ternatea)-Based shampoo: A pretest-posttest control Study. 2024 Aug 12.
 [2]. Dhanalakshmi P, et al. Evaluation of Inhibitory effect of Vernonia cinerea Leaf Extract on different fungal species. International Journal of Pharmaceutical Science Research. 2013 Mar.
 [3]. Dhangar PD, et al. Formulation and Evaluation of herbal extract of Butterfly Pea multi-purpose cream. Research Journal topical Cosmetic Science. 2023.
 [4]. Monton C, Luprasong C. Effect of Temperature and duration time of Maceration on nitrate content of Vernonia Cinerea (L.) Less.: Circumscribed Central Composite design and method validation. International Journal of Food Science 2019; 2019.



- [5]. Naz S, Batool SQN, Munir N. Antifungal Activity of Clitoria ternatea L. Extracts Against different fungal species. Mycopath. 2013.
- [6]. Rajan Pasy, Jeyakumar P, Suriya ARJ, Sheena A, Karuppiah P, Periyasami G, Stalin A, Murugan K. Topical antifungal Keratitis therapeutic Potential of Clitoria Ternatea Linn. Flower extract: Phytochemical profiling, in Silico Modelling, and in vitro biological activity Assessment. Front Microbiol. 2024 Jan 24.
- [7]. Ramdhini RN, Ramdini DA, Kamila DS. Antifungal activity of butterfly Pea flower (ClitInternational Journal of Research and Revieworia ternatea L.) against Candida Albicans causes of dandruff. Journal of Community Health Provision. 2024;4(2).
- [8]. Ramya C, Vishnu AS, Nasila K. A review: Cyanthillium cinereum (L) H. Rob. International Journal of Research and Review. 2021 Sep;8(9):99.
- [9]. Saraf S, Saraf S. Cosmetics: A Practical Manual. 3rd edition. Hyderabad: BSP Publications; 2014 Jan 1.
- [10]. Suresh S, Leelavathi L, Rajeshkumar S, Indiran MA, Priyadarshini JV. Anti-Inflammatory activity and antimicrobial activity against common oral Pathogens of Cyanthillium cinereum – An in vitro study. Journal of Complementary Medicine Research. 2023.
- [11]. Vaishnav GV. Formulation and evaluation Of antimicrobial gel of Clitoria Ternatea. International Journal of Survey in Fisheries Sciences. 2023 Jul.
- [12]. Vakhariya RR, Oza SA, Bhingardeva CS, Patil SJ, Mujawar SF, Mohite SK. Formulation, development and evaluation Of herbal hair serum: A Classical approach To enhance hair quality. International Journal of Pharmaceutical Science Review And Research. 2022 SepOct.
- [13]. Janakiraman AK, Afroze S, 2023. An Expedition Towards Formulating Natural hair Serum with Garcinia mangostana). Current Trends in Biotechnology and Pharmacy.
- [14]. Kamble R, Gamare D, 2022. Formulation and evaluation of Herbal Based anti-aging face serum). Foldscope & its Application.
- [15]. Sasidharan S, Joseph P Junise, 2014. Formulation and Evaluation of Hair serum using polyherbal extracts). Int J Pharm.
- [16]. Thakre A D, 2017. Formulation and development of de Pigment serum Incorporating fruits extract. International Journal of Innovative Science and Research Technology.
- [17]. Ojha S, Sinha S, 2019. Formulation and evaluation of hair Serum Containing bee venom and aloe vera gel). World Journal Of Pharma Research. Doi: 10.20959/wjpr20192-14104. Aishwarya Gite, 2023. Formulation and Development of hair Serum. International Journal of Creative Research Thoughts.
- [18]. Khanna T, Joshi S, 2024. Formulation and evaluation of hair serum. Journal of Medicinal Plants Studies.
- [19]. Patidar M, Deshmukh N, 2023. Formulation and Evaluation of Hair Serum contain phytosome of gingerol oil, carica papaya Pulp extract and Aloe vera gel. World Journal of Pharmaceutical Research. [20]. Dr. Raju Balaji Reddy, Faiza Ashfaq, 2023. Formulation and Evaluation Of hair serum. Indo american journal of Pharmaceutical sciences.

