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Formulation and Evaluation of Anti Hair Fall Shampoo of Hibiscus Plant Leaves

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Abstract: ***The present study focused on the preparation and evaluation of a polyherbal anti-hair fall shampoo formulated with Hibiscus rosa-sinensis leaf extract as the primary active ingredient. Plant materials were washed, extracted using maceration/decoction with ethanol and distilled water, and filtered to obtain concentrated extracts. Phytochemical screening confirmed the presence of alkaloids, flavonoids, tannins, saponins, phenols, and glycosides, indicating a rich profile of bioactive compounds beneficial for hair care. The shampoo was formulated via a cold process method. Guar gum was hydrated to form a gel base, followed by incorporation of natural surfactants (Reetha extract, Decyl Glucoside), antimicrobial agents (Neem, Baheda), humectants (Aloe vera gel, glycerine), and conditioning agents (Hibiscus extract). Sodium benzoate was added as a preservative, and lemon oil was used for fragrance. The final formulation was adjusted to 100 ml and optimized for scalp-friendly pH (5.5–6.5). Evaluation of the prepared shampoo demonstrated favorable organoleptic properties, optimal viscosity, and stable foaming ability. Physicochemical parameters such as solid content, surface tension, and dirt dispersion confirmed effective cleansing action. The formulation showed good stability under storage conditions without changes in color, odor, or consistency. The presence of hibiscus and other herbal extracts contributed to hair strengthening, scalp nourishment, dandruff control, and reduction in hair fall. In conclusion, the developed herbal shampoo exhibited satisfactory physicochemical and performance characteristics, proving effective, safe, and eco-friendly compared to synthetic alternatives. Further clinical studies are recommended to validate its therapeutic efficacy and commercial potential***

Keywords: Hibiscus rosa-sinensis, Polyherbal, Shampoo, Phytochemical, Neem, Extract.

I. INTRODUCTION

Hair loss, clinically known as Alopecia, has become a global concern due to environmental pollution, stress, and the excessive use of synthetic hair care products. Most commercial shampoos contain harsh surfactants like Sodium Lauryl Sulfate (SLS) and Sodium Laureth Sulfate (SLES). While effective at cleaning, these chemicals often strip the scalp of natural oils, leading to follicular damage, dryness, and increased hair fall[1].

1) Hibiscus: A natural multivitamin for scalp. Hibiscus, known as Gudhal in Hindi, is celebrated in Ayurveda as Keshya (a hair-growing herb). Packed with Vitamin C, amino acids, and antioxidants, it offers multiple benefits for hair health. Rich in amino acids, hibiscus stimulates keratin production, helping even dormant follicles regrow. Its natural mucilage (a plant-based gel) coats strands, reducing frizz and leaving hair soft and silky. Vitamin C boosts collagen, strengthening roots and anchoring hair firmly to the scalp. Benefits of hibiscus for hair are encourages keratin synthesis for stronger, healthier strands, acts as a plant-based conditioner, making hair smooth and manageable, nourishes the scalp and strengthens roots to reduce breakage, helps preserve natural pigment with regular use, its antimicrobial properties soothe irritation and reduce flakiness, it acts as a Natural Mucilage (plant glue) that coats hair strands to stop frizz and Its Vitamin C boosts collagen, making your roots "anchor" more firmly to the scalp[2].
2) Baheda (Bibhitaki): Baheda is a tannin-rich Ayurvedic herb that strengthens hair follicles, controls dandruff, and helps manage premature greying. Acting as a natural cleanser, it removes excess oil and impurities, improving scalp health and reducing hair fall. Traditionally, it is applied as a paste (mixed with yogurt, oil, or water) or infused into hair oils. It provides different benefits e.g. astringent properties reduce scalp infections and flakiness, Strengthens follicles for healthier growth, Helps maintain natural pigment, Removes excess oil and impurities[3].

3) Neem: Neem is a powerful natural remedy with antibacterial and antifungal properties. It treats dandruff, soothes itchy scalps, and reduces hair fall. Neem oil, powder, or paste stimulates follicles and improves scalp circulation. It has various key benefits like Fights Proven antimicrobial action reduces fungal growth, Improves blood circulation and strengthens follicles, Moisturizes dry, damaged hair and Antioxidants support scalp health and pigment retention[4].
4) Aloe Vera: Aloe vera hydrates deeply, reduces dandruff, and soothes irritation with its antimicrobial and anti-inflammatory properties. It strengthens strands, balances scalp pH, and can be applied directly or in masks. It founds in various hair preparations with known benefits e.g. Hydrates without greasiness, Enzymes unclog follicles and remove dead cells, Rich in vitamins A, C, E, and B12 and Creates a healthy scalp environment[5].
5) Amla (Indian Gooseberry): Amla is a nutrient-rich superfood for hair, packed with Vitamin C, antioxidants, and minerals. It promotes growth, reduces dandruff, and combats premature greying. Amla having benefits e.g. stimulates circulation and follicle activity, Prevents breakage and reduces fall, Keeps scalp clean and healthy, Maintains natural pigment and adds shine and improves texture[6].
6) Reetha (Soapnut): Reetha, or Aritha, is a traditional Ayurvedic cleanser containing natural saponins. It lathers mildly, removing dirt and excess oil without stripping natural oils. It maintains scalp pH balance and natural cleansing. It controls dandruff Antifungal and antibacterial action. It stimulates circulation for fuller hair helps growth & thickness. It has vitamins smooth cuticles for luster, shine and texture[7].
7) Guar Gum: Guar gum, derived from guar beans, is a plant-based thickener and stabilizer. In hair care, it acts as a binder and emulsifier, improving texture and consistency of formulations[8].

II. MATERIAL AND METHOD

1) Preparation: All the obtained plant parts were washed.
2) Extraction by Maceration/Decoction: The plant materials were Boil in distilled water with ethanol/ for a more concentrated extract. Filter through Muslin cloth followed by Whatman filter paper to ensure no particulate matter remains.
3) Phytochemical screening: Phytochemical screening is the qualitative analysis of plant extracts to detect the presence of various bioactive compounds (phytochemicals) that have therapeutic and physiological activity.

Table No. 1: Phytochemical Tests and Procedures

Phytochemical Test	Procedure	Positive Result
Alkaloids – Mayer's Test	Add Mayer's reagent to extract	Cream/white precipitate
Alkaloids – Wagner's Test	Add Wagner's reagent	Reddish-brown precipitate
Flavonoids – Alkaline Reagent Test	Add NaOH to extract, then dilute acid	Yellow color turns colorless
Flavonoids – Lead Acetate Test	Add lead acetate to extract	Yellow precipitate
Tannins – Ferric Chloride Test	Add $FeCl_3$ to extract	Blue-black or green precipitate
Saponins – Froth Test	Shake extract with water	Persistent foam
Phenols – Ferric Chloride Test	Add $FeCl_3$ to extract	Deep blue or black color
Glycosides – Keller-Kiliani Test	Add glacial acetic acid + $FeCl_3$ + H_2SO_4	Brown ring at interface

III. METHOD OF FORMULATION

1) Hydration Step: Begin by dispersing *Guar Gum* in a small portion of distilled water. Stir continuously until a uniform gel forms. This hydrated gel acts as a natural thickener and stabilizer for the shampoo base.
2) Surfactant Mixing: In the main water phase, add *Reetha extract* (natural cleanser), *Neem* (antimicrobial), *Baheda* (follicle strengthener), *Aloe vera* (hydrating agent), and *Decyl Glucoside* (mild surfactant). Stir gently to ensure proper blending while avoiding excessive foaming.
3) Active Incorporation: Add *Hibiscus extract* for conditioning and scalp health, followed by *Aloe Vera gel* and *Glycerine*. These ingredients enhance moisture retention, improve texture, and provide shine.
4) Preservation: Dissolve *Sodium Benzoate* into the mixture to prevent microbial growth and ensure product stability during storage.
5) Finishing Touches: Add fragrance for sensory appeal, adjust the final volume to 100 ml, and check the pH to ensure it falls within the ideal scalp-friendly range

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A. Evaluation of Prepared

1) Organoleptic Evaluation: Assess color, odor, and clarity to ensure consumer acceptability.
2) pH Determination: Maintain between 5.5–6.5, which is optimal for scalp health and prevents irritation.
3) Solid Content: Evaporate 10 g of shampoo; residue should be 15–25%, indicating balanced formulation.
4) Foam Stability: Using the Ross-Miles method, measure foam volume in a graduated cylinder and observe persistence for 5 minutes. Stable foam indicates effective cleansing.
5) Surface Tension: Measure with a stalagmometer. Natural shampoos should significantly reduce water's surface tension, aiding dirt removal.
6) Viscosity: Test with a Brookfield Viscometer to ensure the shampoo is easy to pour yet thick enough to stay on the hand during application.
7) Dirt Dispersion: Add a drop of shampoo to water with India ink. Proper dispersion (without clumping) indicates effective cleansing ability.

IV. RESULT AND DISCUSSION

Table No. 2: Phytochemical Screening of polyherbal formulation

Phytochemical Test	Result
Alkaloids – Mayer's Test	+ve
Flavonoids – Alkaline Reagent Test	+ve
Tannins – Ferric Chloride Test	+ve
Saponins – Froth Test	+ve
Phenols – $FeCl_3$ Test	+ve
Glycosides – Keller-Kiliani Test	+ve

A. Formula Composition

Table No. 3: Composition of prepared shampoo of hibiscus

Ingredient	Category	Quantity (for 100ml)	Purpose
Hibiscus Leaf Extract	Active	10.0 ml	Hair growth & conditioning
Reetha (Soapnut) Extract	Natural Surfactant	15.0 ml	Primary foaming agent
Aloe Vera Gel	Humectant	5.0 ml	Moisturizing & soothing
Neem	Antimicrobial	10.0 ml	Antidandruff
Bahera	Antidandruff	5.0 ml	Reduce hair fall
Guar Gum	Thickener	1.0 g	Viscosity modifier
Glycerine	Humectant	2.0 ml	Prevents scalp dryness
Sodium Benzoate	Preservative	0.2 g	Prevents microbial growth
Lemon Oil	Fragrance	q.s.	Masking herbal odors
Distilled Water	Vehicle	q.s. to 100 ml	Base medium

B. Evaluation of Prepared Shampoo

1) The formulated anti-hair fall shampoo containing Hibiscus rosa-sinensis leaf extract was evaluated for various physicochemical and performance parameters.
2) The shampoo showed a good appearance, smooth texture, and pleasant odor, indicating acceptable aesthetic properties. The pH was found to be in the range of 5.5–6.5, which is suitable for scalp application and does not cause irritation.
3) The formulation exhibited good foaming ability and foam stability, which is essential for cleansing efficiency. The viscosity was found to be optimal, ensuring ease of application and spreading on hair.
4) The wetting time was within acceptable limits, indicating effective surfactant activity. The shampoo also demonstrated good dirt dispersion, confirming its cleansing capability.

5) In addition, the herbal extract showed anti-hair fall potential, likely due to the presence of bioactive compounds such as flavonoids, mucilage, and antioxidants present in hibiscus leaves. These components help in strengthening hair roots and reducing hair fall.

6) Stability studies indicated that the formulation remained stable under different storage conditions, with no significant changes in color, odor, or consistency.

V. CONCLUSION

The present study concludes that the herbal anti-hair fall shampoo formulated using Hibiscus plant leaves is effective, safe, and suitable for regular use. The formulation demonstrated satisfactory physicochemical properties, including appropriate pH, viscosity, foam stability, and cleansing action. The presence of natural bioactive constituents in hibiscus contributes to hair strengthening, scalp nourishment, and reduction in hair fall. Compared to synthetic shampoos, the herbal formulation offers the advantage of minimal side effects, eco-friendliness, and better compatibility with the scalp. The study supports the use of traditional herbal ingredients in modern cosmetic formulations. Thus, the developed shampoo can be considered a promising natural alternative for managing hair fall. Further studies, including clinical trials, can enhance its commercial applicability and effectiveness.

Conflict Of Interests

There are no any conflicts of interest.

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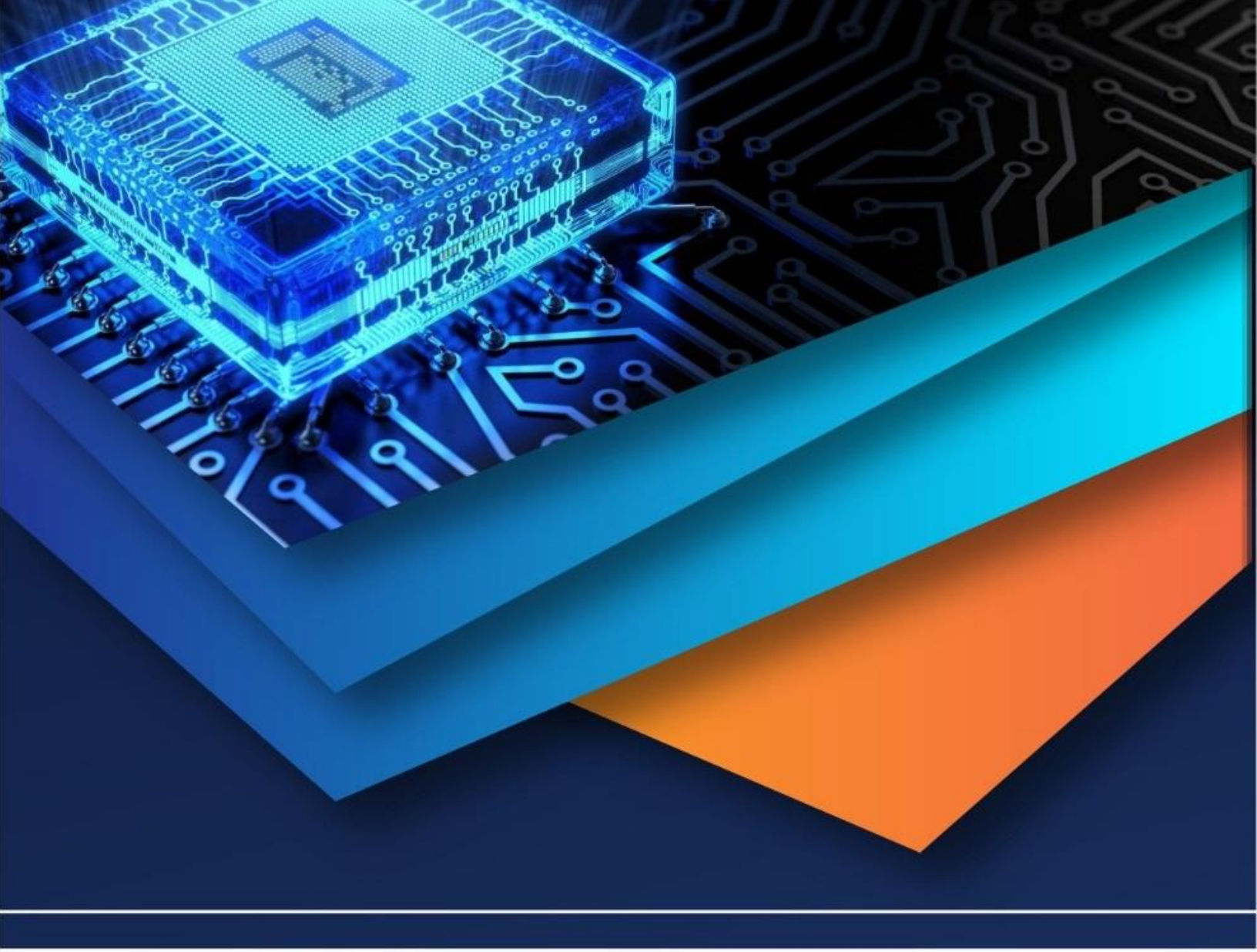

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