Formulation And Evaluation of Herbal Powder Shampoo

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***Abstract*—The present study focuses on the formulation and evaluation of a herbal powder shampoo utilizing locally collected natural ingredients such as Reetha, Shikakai, Amla, Neem, and Aloe Vera. In response to the growing demand for chemical-free and eco-friendly personal care products, this research aims to develop a cost-effective, safe, and efficient alternative to conventional synthetic shampoos. All plant materials were collected in raw form, dried, powdered, and blended in defined proportions to prepare the shampoo. The formulated herbal powder was evaluated for its organoleptic characteristics, pH, foamability, cleansing efficiency, flow properties, and washability. The results indicated that the shampoo exhibited an ideal pH, moderate foam formation, good dirt dispersion, and excellent cleansing action — all while being free from harmful additives or preservatives. This project not only demonstrates the effectiveness of herbal powders in hair care but also promotes self-reliant and sustainable formulation practices, especially in low-resource settings.**

***Index Terms*—Herbal Shampoo, Hair care, Reetha, Shikakai, Neem, Amla, Aloe vera**

I. INTRODUCTION

1. Anatomy of Hair

Hair is a filamentous structure that originates from the epidermis (outer layer) of the skin but extends deep into the dermis. Each hair strand is composed of a hair follicle and a hair shaft. Understanding the structure of hair helps in identifying how different ingredients in shampoos affect the scalp and hair.

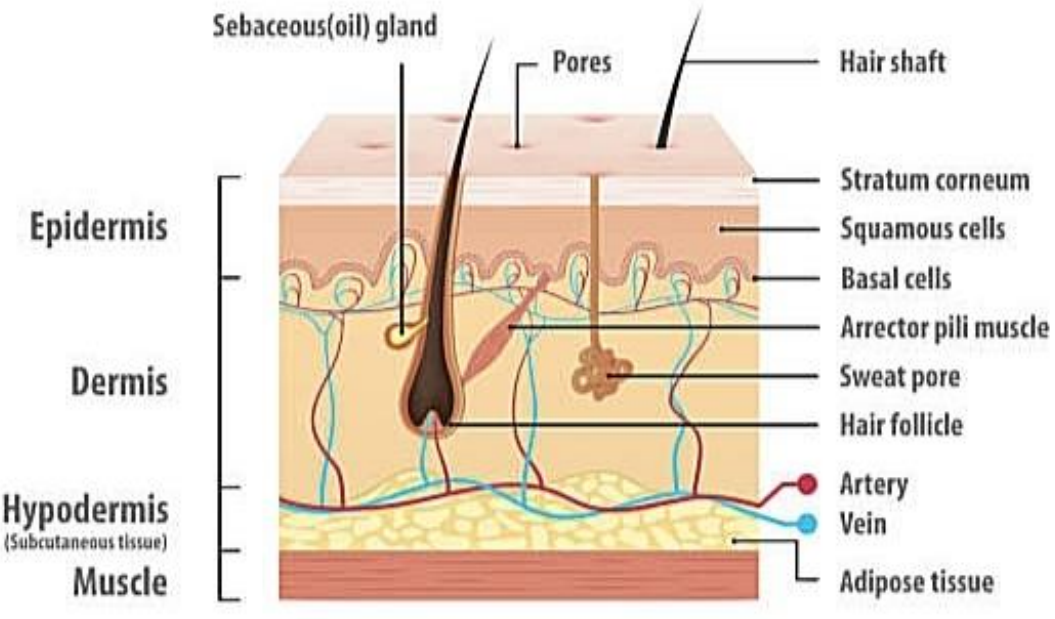

Fig: Cross-section of Skin & Hair

1.1 Hair Shaft

This is the visible part of the hair that grows above the surface of the skin. It is made up of a protein called keratin. The shaft has no nerves or blood supply and consists of three layers:

- Cuticle: The outermost layer made of flat, overlapping cells. It protects the inner layers and contributes to the shine and smoothness of the hair.
- Cortex: The middle layer which contains melanin (gives hair its color) and keratin fibers. It is responsible for hair strength, elasticity, and texture.
- Medulla: The innermost core of the hair strand, which may be absent in thin or fine hair. It plays a minor role in hair structure.

1.2 Hair Follicle

This is the living part of the hair located beneath the skin. It anchors the hair into the scalp and includes:

- Hair bulb: The base of the follicle, where new hair cells are produced.
- Dermal papilla: Contains blood vessels that supply nutrients and oxygen to the growing hair cells.
- Sebaceous gland: Secretes sebum (natural oil) that keeps hair moisturized and protected.
- Arrector pili muscle: A tiny muscle that causes hair to stand up (goosebumps) when it contracts.

1.3 Hair Growth Cycle

Hair grows in a continuous cycle with three main phases:

- Anagen phase (Growth) – Active growth phase, lasting 2–7 years.
- Catagen phase (Transition) – Short phase (2–3 weeks) where growth stops and follicle shrinks.
- Telogen phase (Resting) – Lasts 2–4 months before the hair falls out and a new one begins to grow.

2. Importance of Hair Care

Hair plays a vital role in enhancing a person's physical appearance and self-confidence. Healthy, strong, and well-maintained hair reflects good hygiene and overall wellness. Just like our skin needs regular care, our scalp and hair too require proper attention and nourishment to remain healthy. In today's fast-paced lifestyle, exposure to pollution, harsh weather, dust, sweat, and chemical products often leads to hair problems such as dryness, dandruff, hair thinning, breakage, and premature greying.

- A good hair care routine helps:
- Maintain scalp cleanliness
- Strengthen hair roots
- Prevent hair fall and damage
- Promote natural shine and smoothness

With the increasing focus on grooming and health, both men and women are becoming more conscious about choosing safe and effective hair care solutions.

3. Issues with Synthetic Shampoos

Over the years, numerous commercial shampoos have flooded the market, claiming to offer instant results like silky hair, dandruff removal, or damage repair. However, these products often contain chemical ingredients such as:

Sodium Lauryl Sulfate **(SLS)**	A strong detergent that strips natural oils from the scalp
Parabens	Preservatives linked to hormonal imbalances
Silicones and Artificial Fragrances	Cause buildup on the scalp and allergic reactions
Synthetic Colors	May trigger irritation or long-term skin issues

Regular use of such chemical-based shampoos may lead to :

- Dryness and split ends
- Dandruff and scalp irritation
- Hair thinning and excessive hair fall
- Long-term damage to hair structure

Additionally, these synthetic products contribute to environmental pollution due to their non-biodegradable nature.

3. Why Herbal Shampoo is Preferred

With growing awareness about natural wellness, people are turning toward herbal alternatives that are gentle, effective, and sustainable. Herbal shampoos are formulated using plant-based ingredients that are traditionally known for their medicinal and cosmetic benefits.

- Benefits of Herbal Powder Shampoo:
- Free from harsh chemicals and toxins

- Nourishes hair from root to tip
- Maintains natural oil balance of the scalp
- Suitable for all hair types
- Eco-friendly and biodegradable

Key herbs like Reetha, Shikakai, Amla, Neem, and Aloe Vera have been used for centuries in Ayurvedic and traditional systems for maintaining hair health. These ingredients cleanse the scalp gently, remove impurities, and promote hair growth without any side effects.

Moreover, the powdered form of herbal shampoo provides a longer shelf life, requires no preservatives, and is easy to store or carry during travel. It is cost-effective and highly customizable based on individual scalp/hair needs.

4. Objective of the Project

The primary goal of this project is to formulate and evaluate a natural, herbal powder shampoo using safe and easily available ingredients. The formulation aims to:

- Replace harmful chemical shampoos with a healthy alternative
- Utilize the cleansing, conditioning, and healing properties of traditional herbs
- Ensure ease of preparation, affordability, and stability
- Provide a product that is suitable for regular use and adaptable for small-scale commercialization

This project also aims to promote sustainable beauty practices by encouraging the use of natural resources, reducing chemical exposure, and creating awareness about the benefits of herbal self-care products.

Ingredients Used in Formulation:

Sr. No.	Ingredient	Uses	Image
1.	Biological Name : *Sapindus mukorossi* Family : *Sapindaceae.*	hair cleanser, Helps prevent dandruff and hair fall.	
2.	Biological Name : *Acacia concinna* Family : *Fabaceae*	nourishes scalp, enhances hair shine, Acts as a natural conditioner.	
3.	Biological Name : *Phyllanthus emblica* Family : *Phyllanthaceae* (formerly Classified Under *Euphorbiaceae*)	Strengthens hair roots, promotes hair growth, Prevents premature greying and dandruff.	

4.	Biological Name : *Azadirachta indica* Family : *Meliaceae*	Popular in treating dandruff, hair fall, and scalp infections.	
5.	Biological Name : *Aloe barbadensis* Family : *Asphodelaceae*	Promotes hair growth, prevents dandruff.	

II. METHODS & MATERIALS

Sr. No.	**Ingredients**	**Quantity**			**Role**
		F - I	**F - II**	**F - III**	
1	Reetha	40g	45g	50g	Natural Cleanser
2	Shikakai	15g	20g	20g	Softens Hair
3	Amla	10g	10g	15g	Promotes Hair Growth
4	Neem	10g	10g	10g	Prevents Dandruff
5	Aloe Vera	5g	5g	5g	Hair Conditioning

III. FORMULATION OF HERBAL POWDER SHAMPOO

Formulation Method:

The herbal shampoo powder was prepared entirely from locally collected raw plant materials. This method ensures purity, freshness, and complete control over the quality of each ingredient.

Step 1: Collection of Raw Materials

Fresh raw materials - Reetha fruits, Shikakai pods, Amla fruits, Neem leaves, Aloe & Vera leaves were collected from local sources. All collected materials were verified for cleanliness and authenticity.

Step 2: Washing and Cleaning

All materials were washed thoroughly with clean water to remove dirt, dust, and impurities. Special care was taken with Reetha and Aloe Vera to remove stickiness and outer debris.

Step 3: Drying

The cleaned plant parts were shade-dried for 5-7 days on clean trays, away from direct sunlight to preserve active constituents.

Aloe Vera gel was carefully scooped and sun-dried in a hygienic setup.

Step 4: Grinding

Once completely dried, each ingredient was ground into a fine powder using a clean, dry grinder. Separate grinding was done for each material to avoid cross-contamination.

Step 5: Sieving

All powdered ingredients were sieved using Sieve No. 60 or 80 to ensure uniform particle size and smooth blending.

Step 6: Weighing and Mixing

The sieved powders were accurately weighed using a digital balance based on the formulation ratio.

All powders were mixed manually in a clean bowl using a spatula for 15–20 minutes to achieve uniform distribution.

Step 7: Packaging

The final blended herbal shampoo powder was stored in air-tight, moisture-free containers, labeled with batch details and date of formulation.

Evaluation Parameters

The formulated herbal powder shampoo was evaluated for various physical and functional parameters to assess its quality, safety, and effectiveness.

Organoleptic Properties

- Color: Brownish to greenish depending on the herb combination
- Odor: Characteristic herbal smell
- Texture: Fine, free-flowing powder
- Appearance: Uniform blend with no lumps or gritty particles

pH Determination

The pH was found to be within 4.5 to 6.5, which is ideal and safe for scalp application.

Foamability Test

Moderate to good foam formation indicating the presence of natural saponins (especially from Reetha and Shikakai).

Dirt Dispersion Test

The ink remained in the water and was not absorbed by foam-indicating good cleansing ability.

Flow Property (Angle of Repose)

The angle of repose was found to be below 30°, indicating good flow property of the powder.

Moisture Content

Moisture content was found to be below 5%, ensuring better shelf life and microbial safety.

Washability Test

The powder was easily washable and removed excess oil without leaving residue.

Result

The present study involved the formulation and evaluation of a herbal powder shampoo using natural ingredients. The ingredients were selected based on their traditional use and functional properties. The formulation was prepared by accurately weighing and mixing the herbal powders in appropriate proportions.

❖ Formulation Table of herbal Powder Shampoo

The composition of the prepared Herbal Powder Shampoo is presented in the table below.

Sr. No.	Ingredients	Quantity (%)	Function
1.	Reetha Powder	50 %	Cleanser
2.	Shikakai Powder	20 %	Conditioner

3.	Amla Powder	15 %	Strengthener
4.	Neem Powder	10 %	Antimicrobial
5.	Aloe Vera Powder	5 %	Soothing & Nourishment

The formulated herbal powder shampoo was subjected to various evaluation tests, and the results indicated that the product meets the required standards for natural hair cleansers.

REFERENCES

[1] Kokate C.K., Purohit A.P., Gokhale S.B. (2014). Pharmacognosy, 49th Edition. Nirali Prakashan.

[2] Khandelwal K.R. (2013). Practical Pharmacognosy: Techniques and Experiments, 23rd Edition. Nirali Prakashan.

[3] Pattanayak S., Nayak S., Dinda S.C. (2012). "Formulation and evaluation of herbal shampoo powder." International Journal of Research in Ayurveda and Pharmacy, 3(6), 835-837.

[4] Singh S., Mishra N. (2017). "Herbal cosmetics: used for skin and hair." World Journal of Pharmaceutical Research, 6(6), 472-489.

[5] Mukherjee P.K. (2002). Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers.

[6] Khare C.P. (2007). Indian Medicinal Plants: An Illustrated Dictionary. Springer Publications.

[7] Dev S. (2006). Ancient-Modern Concordance in Ayurvedic Plants. Indian National Science Academy.

[8] World Health Organization (2000). General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine.

[9] https://www.ncbi.nlm.nih.gov/Information (Accessed 2025) National Center for Biotechnology.

[10] https://www.researchgate.net/ Scientific literature on herbal shampoo evaluation (Accessed 2025).

[11] https://www.ayush.gov.in Ministry of AYUSH, Government of India (Accessed 2025).

[12] Personal lab notes and formulation diary maintained during project work (2025).

[13] Sharma R., et al. (2017). "A comparative study on the foaming and surfactant properties of herbal shampoo ingredients." Journal of Cosmetic Science, 68(4), 321-330.

[14] Mishra, A., & Kumar, P. (2018). "Phytochemical analysis and antimicrobial evaluation of herbal ingredients in cosmetic formulations." International Journal of Pharmaceutics and Cosmetics, 9(2), 55-67.

[15] Patil, P., & Deshmukh, P. (2019). "Herbal shampoos: A review of ingredients and formulations." International Journal of Herbal Medicine, 7(1), 18-25.

[16] Rathi, A., & Saini, R. (2020). "Evaluation of hair care products based on natural extracts: A comparative study." Cosmetic and Toiletries Science, 4(3), 56-63.

[17] Garg, A., & Gupta, M. (2021). "Aloe Vera and Neem: Beneficial effects in cosmetic applications." Journal of Herbal Medicine, 6(2), 42-49.

[18] Bajpai, R., & Sharma, S. (2021). "Evaluation of Herbal Ingredients in Cosmetics and Personal Care Products: A Review." Journal of Cosmetic Dermatology, 20(5), 1563-1570.