



“Formulation And Evaluation Of Herbal Anti-Dandruff Shampoo”

Mr. Pranay Nitin Mali¹, Mr. Tushar A. Gaikwad², Mr. Tushar A. Gaikwad³

¹ Research Scholar, Department of Pharmacognosy, Late Narayandas Bhawandas Chhabada Institute of Pharmacy, Raigaon, Satara. Dist: Satara, Maharashtra. 415020

² Assistant Professor, Department of Pharmacology, Late Narayandas Bhawandas Chhabada Institute of Pharmacy, Raigaon, Satara. Dist: Satara, Maharashtra. 415020

³ Assistant Professor, Department of Pharmacology, Late Narayandas Bhawandas Chhabada Institute of Pharmacy, Raigaon, Satara. Dist: Satara, Maharashtra. 415020

Email- pranaymali2002@gmail.com

ABSTRACT :

This study aims to develop and evaluate a shampoo made from natural ingredients for cosmetic applications. A herbal anti-dandruff shampoo was formulated using various plant-based components, including Shikakai, Reetha, Neem, Orange Peel, and Aloe Vera gel. The formulation was assessed based on parameters such as pH, viscosity, foam stability, and user satisfaction.

Dandruff, a common scalp condition, is primarily caused by the fungi *Malassezia restricta* and *Malassezia globosa*. This research explores the incorporation of different antifungal agents in hair care products to effectively combat dandruff.

Keywords: Dandruff, Antifungal, Various herbs, Evaluation.

INTRODUCTION

Anti-dandruff products are designed to prevent the formation of dandruff flakes. Dandruff is a common cosmetic concern in both developed and developing countries, primarily caused by the fungi *Malassezia restricta* and *M. globosa*. It occurs when epidermal cells on the scalp shed in large quantities. Normally, the scalp undergoes a regeneration cycle approximately once a month, during which dead skin cells are shed in a barely noticeable manner. However, when cell turnover accelerates abnormally, these dead cells appear as visible flakes, resulting in dandruff¹.

Shampoos are widely used hair care products that cleanse the scalp and hair while also offering benefits such as conditioning, lubrication, volume enhancement, static reduction, and even therapeutic effects. It is essential that the overall formulation of a shampoo remains safe for long-term use.

A newly formulated herbal anti-dandruff shampoo demonstrated greater effectiveness than commercially available herbal alternatives. This superiority is attributed to neem, a natural anionic surfactant with antimicrobial and preservative properties².

EXPERIMENTAL WORK METHOD OF PREPARATION

1. Weighing:-

A computerized balance was used to accurately measure each essential herbal ingredient for shampoo formulation

2. Extraction:

The herbal ingredients needed for the shampoo formulation were obtained using the decoction method.

Decoction is a traditional extraction technique primarily used for extracting water-soluble and heat-stable compounds. In this process, the raw plant material is boiled in an open container with a measured amount of water for a predetermined duration.

3. Mixing:-

To create a clear shampoo, all extracted ingredients are thoroughly mixed. In the final step, fragrance is added to the blend.

4. Storage:-

Store in suitable container³.

Table no.1.Formulation

Sr.No.	INGREDIENT	QUALITY TAKEN	USES
1	Shikakai Extract	10ML	Anti-dandruff effect
2	Reetha Extract	10ML	Foam Base Effect
3	Orange Peels Extract	10ML	Anti-Oxidant Effect
4	Neem Extract	3ML	Surface And Anti-microbial Effect
5	Aloe-Vera gel	50ML	Anti-dandruff Effect
6	Rose oil Q.S	Q.S	Perfume
7	Water Q.S	Q.S	Dilute

Shikakai :

Shikakai (Acacia concinna) is a traditional Ayurvedic herb commonly used as a natural hair cleanser and conditioner. It is a climbing shrub native to India and has been used for centuries to promote healthy hair growth.

Benefits of Shikakai

Natural Hair Cleanser – Acts as a mild shampoo that cleanses the scalp without stripping natural oils.

Promotes Hair Growth – Strengthens hair roots and reduces hair fall.

Prevents Dandruff – Has antifungal and antibacterial properties that help with dandruff and scalp infections.

Adds Shine and Softness – Works as a natural conditioner, making hair smooth and manageable.

Delays Premature Graying – Rich in antioxidants that help maintain natural hair color. Soothes Scalp – Helps in reducing itchiness and irritation.

Detangles Hair – Makes hair soft and easier to comb without breakage. How to Use Shikakai

Shikakai Powder Shampoo: Mix shikakai powder with water to form a paste and use it as a shampoo.

Shikakai Hair Oil: Soak shikakai pods in coconut oil and use the infused oil for scalp massage.

Shikakai Hair Mask: Blend shikakai with yogurt or aloe vera for deep conditioning. Side Effects⁴.

Reetha :

Reetha, also known as soapnut (scientific name: Sapindus mukorossi), is a natural cleanser commonly used in India and other parts of Asia. It contains natural saponins, which create a mild lather when mixed with water, making it a great alternative to chemical-based soaps and detergents.

Uses of Reetha:

Hair Care: Used in shampoos and hair cleansers to promote healthy, shiny hair and reduce dandruff.

Skin Care: Acts as a gentle face and body cleanser, helping with acne and skin allergies. Laundry: Used as an eco-friendly detergent for washing clothes, especially delicate fabrics. Jewelry Cleaning: Helps clean gold and silver ornaments naturally.

Pesticide Alternative: Used to keep pests away from plants and grains⁵.

Orange Peel :



Orange peels are surprisingly useful! They contain essential oils, antioxidants, and fiber, making them great for cooking, cleaning, skincare, and even gardening.

Some Uses for Orange Peels:

1. Cleaning: The natural oils in orange peels cut through grease and grime. You can infuse vinegar with peels for a homemade cleaner.
2. Cooking & Baking: Dried orange zest adds flavor to desserts, teas, and marinades.
3. Skincare: The vitamin C in orange peels can brighten skin—try an orange peel face scrub.
4. Gardening: Peels deter pests like ants and cats, and they compost well.
5. Aromatherapy: Simmer peels on the stove with cinnamon scent⁶.

Neem :



Neem leaves are highly valued in hair care due to their potent natural properties. Traditionally used in Ayurvedic medicine, neem offers several benefits when incorporated into shampoos or hair rinses:

Key Benefits

- Antibacterial and Antifungal Properties: Neem helps combat dandruff and scalp infections by inhibiting the growth of bacteria and fungi.
- Anti-Inflammatory Effects: It soothes irritated scalps, reducing redness and inflammation.
- Hair Strengthening: Regular use may help strengthen hair roots, reducing breakage and promoting overall hair health.
- Natural Cleanser: Neem gently cleanses the scalp without stripping natural oils, which is ideal for sensitive or dry scalps.

How to Use Neem Leaves in Shampoo

Neem Water Rinse:

Boil a handful of neem leaves in water for about 15–20 minutes. Let the solution cool completely, then strain it. After shampooing, use this neem water as a final rinse to soothe your scalp and add shine.

Neem Leaf Paste:

Grind fresh neem leaves into a fine paste. Mix the paste with water or aloe vera gel. Apply it to your scalp, leave it on for about 15 minutes, and then wash off with a gentle shampoo.

Incorporated in Natural Shampoo :

Some natural shampoo formulations include neem extract or powder as an active ingredient. These products combine neem with other herbs and oils to maximize benefits for the scalp and hair.

Additional Tips

Consistency is Key: For best results, incorporate neem treatments into your hair care routine regularly.

Combine with Other Ingredients: Neem works well with other natural ingredients like amla, hibiscus, or coconut oil, which can further enhance hair health.

By integrating neem leaves into your shampoo routine, you can enjoy a naturally healthy scalp and hair, free from many of the common issues like dandruff and irritation^{7,8}.

Aloe- Vera :



Aloe vera is a succulent plant known for its medicinal and skincare benefits. It has been used for centuries in traditional medicine for its healing, hydrating, and anti-inflammatory properties.

Benefits of Aloe Vera

1. Skin Benefits :

Soothes Sunburn – Has cooling and anti-inflammatory properties.

Treats Acne – Contains antibacterial and healing compounds that reduce breakouts. Moisturizes Skin – Hydrates without making the skin greasy.

Reduces Aging Signs – Helps with wrinkles and fine lines due to its rich antioxidants. Heals Wounds & Cuts – Speeds up wound healing and reduces scarring.

2. Hair Benefits :

Promotes Hair Growth – Strengthens hair follicles and reduces hair fall. Reduces Dandruff – Has antifungal and moisturizing properties.

Conditions Hair – Adds shine and smoothness.

3. Health Benefits :

Aids Digestion – Aloe Vera juice can relieve constipation and promote gut health.

Boosts Immunity – Contains vitamins and antioxidants that strengthen the immune system. Lowers Blood Sugar – May help manage diabetes by regulating blood sugar levels.

How to Use Aloe Vera

For Skin: Apply fresh aloe vera gel directly or mix with honey or coconut oil. For Hair: Use aloe vera gel as a hair mask or mix with shampoo.

For Health: Drink aloe vera juice in moderation (consult a doctor if unsure).

Side Effects

Some people may be allergic to aloe Vera—do a patch test before use.

Aloe Vera latex (found in the inner leaf) may cause stomach discomfort if consumed in excess^{9,10}.

Rose Oil



Rose oil is a highly prized essential oil extracted from the petals of certain rose species— most notably *Rosa damascena* (the Damask rose) and *Rosa centifolia* (the cabbage rose). Its unique, complex aroma and potential therapeutic properties have made it a staple in perfumery, aromatherapy, and high-end cosmetics for centuries.

Extraction and Production Labor-Intensive Process:

Producing rose oil is extremely labor-intensive. It can take thousands of rose petals to yield just a single milliliter of oil, which is why genuine rose oil is so expensive. The extraction is usually done through steam distillation or solvent extraction, with steam distillation being the traditional method that helps preserve many of the oil's delicate aromatic compounds.

Yield and Quality:

Due to the low yield and sensitivity of the extraction process, the quality of rose oil can vary greatly. Premium grades are often sought after not just for their fragrance, but also for their consistent therapeutic properties.

Chemical Composition

Rose oil contains a blend of volatile compounds, including:

Citronellol: Contributes to the floral, citrus-like scent.

Geraniol: Adds a rosy note and is known for its antimicrobial properties. **Nerol:** Offers a slightly sweet and fresh aroma.

Phenyl Ethyl Alcohol: Provides a subtle, honey-like scent and is sometimes associated with calming effects.

These components not only define its scent profile but are also linked to various potential benefits.

Uses and Benefits Aromatherapy:

The soothing fragrance of rose oil is often used to reduce stress, improve mood, and promote emotional well-being. Its calming aroma can help ease anxiety and promote relaxation.

Skincare:

Thanks to its potential anti-inflammatory and antimicrobial properties, rose oil is a popular ingredient in skincare formulations. It may help reduce redness, improve skin hydration, and even combat certain skin irritations. Its gentle nature makes it suitable for sensitive skin, although a patch test is recommended before widespread use.

Perfumery:

The oil's distinctive, luxurious scent makes it a cornerstone in many high-end perfumes and personal care products. Its ability to blend well with other floral, citrus, or spicy notes further enhances its versatility in fragrance design.

Traditional and Holistic Practices:

Historically, rose oil has been used in various traditional remedies. In addition to its topical uses, it's sometimes diffused into the air to help create a calming environment, supporting practices like meditation and relaxation.

Considerations and Safety

Allergy and Sensitivity:

Despite its benefits, some individuals may experience skin irritation or allergic reactions. It's advisable to dilute rose oil with a carrier oil when using it for topical applications.

Quality and Authenticity:

Given its high cost and demand, ensuring the authenticity of rose oil is important. Buyers should look for reputable suppliers and certifications that verify the oil's purity and extraction methods¹¹.

FORMULATION



EVALUATION TEST FOR SHAMPOO

1. Visual Inspection:-

The developed formulations were evaluated for their flow properties, transparency, and ability to generate foam



2. Foaming Ability And Foam Stability:-

The foaming capacity was assessed using the cylinder shake method. A 3 ml sample of shampoo was diluted with 10 ml of water. The mixture was then shaken vigorously twice within one second and left undisturbed for 15 minutes. The total foam volume was recorded immediately after shaking, with measurements taken at one-minute intervals for four minutes. The foam remained stable for approximately five minutes, indicating that the shampoo produces a long-lasting and consistent foam. This stability may be attributed to the presence of reetha, which enhances the foaming properties¹².

3. Determination Of PH:-

The pH of 10% v/v shampoo solution in distilled water was measured by using calibrated pH.

4. Percent of solid content: -

A clean, dry porcelain dish was first weighed, and then 4 ml of shampoo was added. The total weight of the dish with the shampoo was measured to determine the exact weight of the shampoo. The dish containing the shampoo was then placed on a hot plate and heated until all the liquid evaporated. Once dry, the final weight was recorded



5. Wetting test: -

The time required for the canvas paper to fully absorb the water was recorded as the wetting time. A 1-inch diameter disc, cut from a piece of canvas paper weighing 0.44g, was placed on the surface of a 1% (v/v) shampoo solution. A stopwatch was used to measure the duration it took for the disc to sink¹³.



6. Stability study:-

The formulation's stability was evaluated over four weeks at a temperature range of 25- 30°C. The shampoo remained stable at room temperature and showed no signs of microbial contamination

7. Surface Tension:-

The cleaned stalagmometer was filled with the prepared shampoo up to mark A for testing. Once the liquid began to drip due to gravity, the number of drops formed as it moved from mark A to mark B was recorded. This procedure was repeated three times to calculate the average value. The surface tension was then determined using the appropriate formula¹⁴.

EVALUATION PARAMETER	OBSERVATION
Appearance	Good Foaming
Foam Index	Good -13.3
PH	6.0±0.01
Clarity	Clear Solution
Wetting Ability	3sec
Determination of %Solid Content	35%solid content
Surface Tension	47.78±1.5

RESULT AND DISCUSSION :-

A simple mixing process was employed to develop an herbal anti-dandruff shampoo by incorporating specific herbal ingredients as outlined in the formulation table. This study focuses on the formulation and assessment of a natural anti-dandruff shampoo made from Shikakai powder, Reetha, Aloe Vera gel, and other herbal components.

The shampoo was prepared using a continuous stirring technique along with sodium neem extract. Various tests were conducted to evaluate its effectiveness, as detailed in Table 2. The findings indicated that the shampoo was cost-effective, efficient in addressing dandruff and dermatitis, and contributed to healthier, shinier hair. Based on this study, the formulated herbal anti-dandruff shampoo met high-quality standards, exhibiting an optimal pH range, stability, cleansing ability, foam production, and viscosity.

REFERENCES :-

1. Gupta, A. K., Kohli, Y., & Batra, R. (2014). Association of *Malassezia* species with dandruff. *Journal of Clinical Microbiology*, 52(3), 1078–1082.
2. Khandagale, S. S., Supekar, A. V., Sarukh, V. S., Bhasme, P. S., Shaikh, A., Shaikh, U., & Shaikh, F. (2023). Formulation and Evaluation of Herbal Neem Anti-Dandruff Shampoo. *International Journal of Ayurveda and Pharma Research*, 10(12), 36–41.
3. Kumar, P. S. S., et al. (2024). "Formulation and Evaluation of Herbal Shampoo." *Journal of Pharmacognosy and Phytochemistry*, 13(2), 165–170.
4. N.S. Sahu, N.P. Sharma, A.K. Tripathi, *Phytotherapy Research* Title: "Phytochemical and Pharmacological Evaluation of *Acacia concinna* (Shikakai): Volume 28, Issue 1, Pages 23-30.
5. P.K. Ghosh, S. K. Mehta, *Phytochemistry and Pharmacology of Natural Products* Publisher: Springer, 2005, (pages 215–220).

6. Dr. Peter L. R. Williams, *Herbal Medicine: Biomolecular and Clinical Aspects* Publisher: CRC Press, 2011, (pages 315–318).
7. Vasant Lad, *The Complete Book of Ayurvedic Home Remedies* Publisher: Harmony Books, 1998, (pages 200–205).
8. Dr. David Frawley, *Ayurveda and the Mind: The Healing of Consciousness* Publisher: Motilal Banarsidass, 2000, (pages 188–192).
9. James A. Duke, *The Green Pharmacy: The Ultimate Compendium of Natural Remedies from the World's Foremost Authority on Healing Herbs*, (pages 102–108).
10. John Heinerman, *Heinerman's Encyclopedia of Healing Herbs and Spices*, (pages 121–125).
11. Gary Young, *The Healing Power of Essential Oils* Publisher: Young Living, 2000, (pages 210–215).
12. V. N. S. N. Murthy, *Shampoo and Hair Care: Formulation and Testing* Publisher: CRC Press, 2011, (pages 50–55).
13. B. K. Sharma, *Analysis of Cosmetics and Toiletries* Publisher: CRC Press, 2015, (pages 100–105).
14. D. B. W. MacLeod, *Cosmetic Science and Technology: A Comprehensive Guide to the Manufacture of Personal Care Products*, (pages 50–55).