



A Review on: Formulation and Evaluation of salicylic Acid Anti-Dandruff Shampoo

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ABSTRACT

Dandruff is a prevalent condition that affects the scalp, primarily caused by the yeast *Pityrosporum*. While it cannot be completely eradicated, it can be effectively managed and controlled. The primary symptoms of dandruff include the presence of flakes, scalp itching, and redness in the scalp area. Treatment options for dandruff are twofold: chemical-based anti-dandruff shampoos and herbal-based alternatives that incorporate antibacterial and antifungal components such as ketoconazole, selenium sulfide, and zinc pyrithione. Although anti-dandruff shampoos can reduce scalp flaking, they may also lead to adverse effects, including hair loss, increased scaling, itching, irritation, nausea, headaches, vomiting, and photosensitivity. Herbal formulations present a promising alternative to synthetic treatments. Currently, numerous herbal shampoos are available on the market, featuring ingredients like plant extracts and essential oils. This review will explore the causes of dandruff, the role of synthetic chemicals, various herbal remedies, and the evaluation criteria for anti-dandruff shampoos.

KEYWORDS :- Anti-dandruff, Anti-fungal, Antibacterial

Introduction

Hair is a protein structure that emerges from follicles located in the skin. It is predominantly composed of keratin, a resilient protein, and fulfills multiple roles such as providing protection, insulation, and sensory feedback.

Structure

1. Hair Shaft: The externally visible portion consists of three distinct layers:
 - Cuticle: The outermost layer that serves to safeguard the inner structures.
 - Cortex: The intermediate layer, which houses pigment and contributes to the hair's strength.
 - Medulla: The innermost layer, typically present in coarser hair types.
 2. Hair Follicle: The anatomical structure located within the skin responsible for hair production, comprising cells that undergo division and growth.
 - i. Types of Hair
 - Terminal Hair: Coarse, lengthy hair located on the scalp, face, and various parts of the body.
 - Vellus Hair: Fine, short hair that covers the majority of the body, commonly known as "peach fuzz."
 - ii. Growth Cycle
- Hair undergoes three distinct phases:
1. Anagen: The active growth phase, which can last for several years.
 2. Catagen: The transitional phase, typically lasting a few weeks.
 3. Telogen: The resting phase, which endures for several months before the hair sheds and the cycle recommences.
- iii. Factors Influencing Hair
 - Genetics: Determines the texture, color, and growth patterns of hair.
 - Health: Nutritional deficiencies, hormonal fluctuations, and stress levels can significantly impact hair health and growth.

- Care: The choice of products and styling techniques can affect the strength and overall appearance of hair.

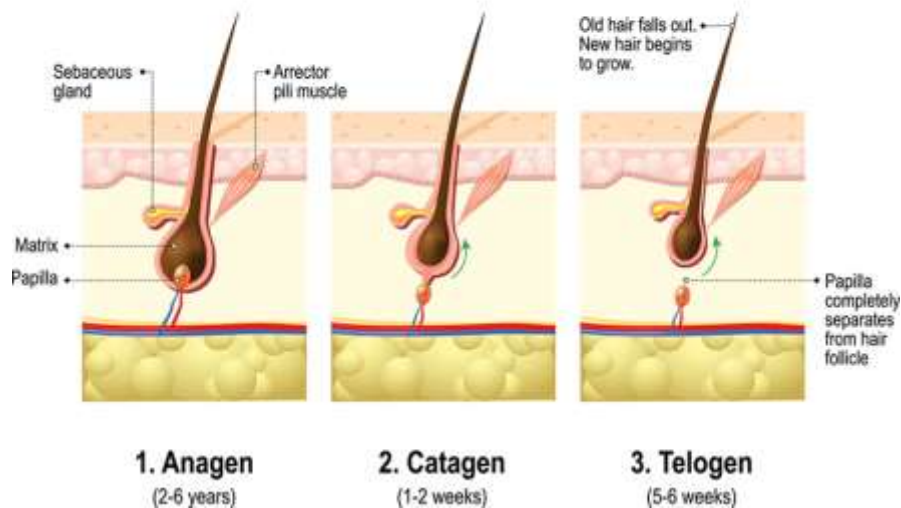
iv. Common Hair Concerns

- Hair Loss: May be attributed to genetic factors (such as male or female pattern baldness) and stress.

- Dandruff: Characterized by flaky scalp skin, often resulting from dryness or fungal infections.

- Damage: Excessive styling, heat exposure, and chemical treatments can cause breakage and split ends.

HUMAN HAIR GROWTH



Dandruff is a prevalent condition affecting the scalp, marked by the presence of flakes and associated itching. This condition may arise from multiple causes, such as dry skin, oily skin (seborrheic dermatitis), sensitivity to hair care products, or an overgrowth of a yeast-like fungus known as *Malassezia*.

Symptoms include:

- White or yellow flakes on the scalp and shoulders
- Itchy, irritated, or inflamed skin in more severe cases.

A Score 0



B Score 1



Score 2



Score 3



Risk Factors

Dandruff can affect individuals of all ages; however, certain conditions may increase one's likelihood of developing it:

- Age. Dandruff typically emerges during young adulthood and may persist into middle age. Nevertheless, older adults are not exempt, as some individuals may experience dandruff throughout their lives.
- Gender. Males are more frequently affected by dandruff compared to females.
- Specific health conditions. Disorders such as Parkinson's disease and other conditions impacting the nervous system appear to elevate the risk of dandruff. Additionally, individuals with HIV or those possessing a compromised immune system are also at a higher risk.

Classification of Dandruff

A. Dry Dandruff

Also referred to as pityriasis simplex, this condition is characterized by the excessive production of small scales that accumulate on the scalp. In this variant, there is no significant hair loss, and inflammation of the skin is not present. The scales typically first appear in the central region of the scalp before spreading to the frontal, parietal, and occipital areas.

B. Oily Dandruff

Known as pityriasis steatitis, this type of dandruff is associated with increased sebum production on the scalp. It is predominantly observed in young males post-puberty. This condition is marked by varying degrees of inflammation on the scalp, accompanied by oily scales that are typically a dirty yellow color. Hair loss is frequently associated with this type of dandruff, which commonly affects the scalp, the area behind the ears, the breastbone, and the armpits.

Advantages and Disadvantages of Anti-Dandruff Shampoos

Advantages:

1. Anti-dandruff shampoos frequently incorporate an activating moisturizer that effectively combats dryness, promoting a healthy scalp and enhancing the beauty of the hair.
2. These shampoos often contain a zinc-based component that can provide mild relief from itching, contributing to a refreshed scalp and overall comfort.
3. The soothing formulation of anti-dandruff shampoos alleviates irritation while ensuring the hair remains healthy and free from dandruff.
4. In addition to soothing irritation, these shampoos help diminish redness, resulting in a pleasant scalp sensation and an improved appearance.
5. Anti-dandruff shampoos are particularly effective in managing scalp oiliness.

Disadvantages:

1. Potential side effects may include skin irritation, dry skin, oily or dry hair/scalp, and temporary hair loss. Should any of these effects persist or worsen, it is advisable to cease use and consult a healthcare professional promptly. Hair discoloration may also occur, which can be mitigated by thoroughly rinsing the hair after each application.
2. Although serious allergic reactions to these products are uncommon, immediate medical attention should be sought if symptoms of a severe allergic reaction arise, such as rash, itching or swelling (especially of the face, tongue, or throat), severe dizziness, or difficulty breathing.

Ingredients Used in Anti-dandruff shampoo

1] glycerin: It helps in moisturizing hair



2] Sodium Chloride: It is used as a thickener



3] Sodium lauryl sulphate (SLS): It is used as a surfactant .



Salicylic acid: used to treat dandruff and breaks down layer of thick skin on scalp.



Distilled water: used to look hair shinier and healthier.



Perfume: Used to add sensory aesthetic dimension to the shower experience, masking unpleasant odours from product.



- 4) Preservatives : used to inhibit the growth of microorganisms such as bacteria, yeast etc.



Evaluation of Anti-Dandruff Shampoo

1. Foam and Foam Stability

The Ross-Miles foam column test is widely recognized for assessing foam characteristics. In this procedure, 200 ml of a surfactant solution is introduced into a glass column containing 50 ml of the same solution. The height of the foam produced is measured immediately and again after a predetermined time interval, with the height being considered proportional to the foam volume. Barnett and Powers created a lather meter to evaluate how various factors, such as water hardness, soil type, and soil quantity, influence foam speed, volume, and stability. Fred Ell and Read conducted titrations on standard oiled hair samples, adding increments of shampoo until a stable lather endpoint was achieved.

2. Physical Appearance

The formulated shampoo was assessed for its visual characteristics, including transparency, color, and consistency.

- Appearance: Viscous
- Color: Brown
- Transparency: Opaque
- Consistency: Smooth

3. Stability Studies

The formulation's stability was evaluated by placing the cream in a plastic container and storing it in a humidity chamber at 45°C with 75% relative humidity. The formulation was inspected for stability over a period of three months, with evaluations conducted at one-month intervals.

4. Detergency and Cleaning Action

- The cleansing efficacy was assessed using the method established by Barnett and Powers. A 5 g sample of soiled human hair was immersed in 200 cc of water at 35°C, containing 1 g of shampoo. The mixture was agitated at a rate of 50 shakes per minute for four minutes. The hair was then rinsed with an adequate amount of water, filtered, dried, and weighed. The quantity of soil removed under these conditions was subsequently calculated.

5. Wetting Action

- The canvas disk sinking test involved a Mount Vernon cotton duck #6 canvas disk, measuring one inch in diameter, which was floated on the surface of a solution. The time taken for the disk to sink was measured with precision.

6. Conditioning Action:

The assessment of conditioning action presents significant challenges due to its reliance on subjective evaluation. Currently, there is no established method for quantifying conditioning action. Ultimately, the level of conditioning experienced by users is determined by their personal experiences and expectations.

7. pH Determination:

A 10% v/v solution of shampoo was prepared using distilled water, and the pH level of this solution was measured with a calibrated pH meter.

8. Dirt Dispersion:

In a wide-mouthed falcon tube containing 10 ml of distilled water, two drops of herbal shampoo were introduced. Following this, one drop of India ink was added, and the tube was sealed and shaken ten times. The concentration of ink present in the foam was categorized as None, Light, Moderate, or Heavy.

9. Cleansing Action:

The cleansing efficacy of the herbal shampoo was assessed by applying it to hair that had not been washed for a duration of seven days. The shampoo was utilized on a human subject who had applied oil to their hair 4-5 hours prior to washing. The evaluation focused on the shampoo's effectiveness in removing oily residues from the scalp.

10. Skin Irritation Test:

The formulated shampoo was applied to the skin for a duration of five minutes, after which it was rinsed off and examined for any signs of irritation or inflammation.

Marketed products of salicylic acid antidandruff shampoo

CONCLUSION

The primary objective of the developed herbal anti-dandruff shampoo was to inhibit dandruff and associated infections.

It was determined that anti-dandruff shampoos derived from natural ingredients exhibit fewer side effects in comparison to those formulated with synthetic compounds.

The formulated shampoo was assessed through various parameters and was deemed suitable for application to the hair.



Reference

1. Bhagwat SS. Formulation and evaluation of herbal shampoo. *International Journal of Creative Research*.2020;8(9):2860-2869
2. Wani S, Khot N, Buchake VV. Preparation and evaluation of anti-dandruff polyherbal powder shampoo. *Pharmacophore*. 2014;5(1):77-84.
3. Ranganathan and Mukhopadhyay, *CME Article*2010, Volume-55, page: 130-134.
4. Loden and Wessman, *International Journal of Cosmetic Science* 2001, Volume22, Issue4.
5. Arora, P.; Arun, N.; Karan, M. Shampoos based on synthetic ingredients vis-à-vis shampoos based on herbal ingredients: A review. *Int. J. Pharm. Sci. Rev. Res*. 2011, 7, 41-46
6. Kadima R.B and Saad, A.H. 2011. Formulation and Evaluation of herbal shampoo from ziziphus spina leaves extract. *International Journal of Research in Ayurveda and Pharmacy*. 2(6):1802-1806
7. Shinde PR, Tatiya AU, Surana SJ. Formulation and Evaluation of Antidandruff Shampoo. *International Jnl of research in Cosmetic Science*. 2013; 3(2):25-33.
8. Sharma, PP. *Cosmetics-Formulation, Manufacturing and Quality control*, 3rd ed. Lucknow: Vandana Publications; 1998. p. 644-776.
9. Potluri A, Harish G, Kumar B, Durraivel. Formulation and Evaluation of Herbal Antidandruff Shampoo. *Ind J Res Pharm Biotech*. 2013; 1(6): 835-839.
10. Balsam, S.M., Gershon, S.D., Rieger, M.M., Sagarin, E., and Strianse, S.J.: *COSMETICS— Science and Technology*, 2nd edition, Vol-2, John Wiley India, New Delhi, 2008
11. Pooja A, Arun N, Maninder K. Shampoos based on synthetic ingredients vis-à-vis shampoos based on herbal ingredients. A review. *Int J Pharm Sci Rev Res*. 2011; 7:41-46
12. Wuthi-udomlert M, Chotipatoomwan P, Panyadee S, Gritsanapan W. Inhibitory effect of formulated lemongrass shampoo on *Malassezia furfur*: A yeast associated with dandruff. *S East Asian J Trop Med Public Health* 2011;42:363-9.

13. Naveen S, Karthika S, Sentila R, Mahenthiran R, Michael A. In-vitro evaluation of herbal and chemical agents in the management of Dandruff. *J Microbiol Biotech Res* 2012;2:916-21.
14. Kumar A, Mali RR. Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos. *Int J Pharm Sci. Review and Research*. 2010; 3(1):120-126.
15. Butler, H.: *POUCHER'S – Perfumes, Cosmetics & Soaps*, 10th Edition, Springer, Cockermonth, Cumbria, USA, 2000.