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Review Article

Formulation and Evaluation of Herbal Anti-Dandruff Shampoo

Rohit Panage*, Prerna Amle, Namrata Pitale, Nikita Hamane, Kiran Khodke, Dr. Ramesh Ingole

DJPS College of pharmacy, Pathri.

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ABSTRACT

Dandruff is a common scalp condition characterized by flaking and Itching, often associated with the overgrowth of *Malassezia* yeast. This Study focuses on the formulation and evaluation of an anti-dandruff Shampoo designed to effectively reduce dandruff symptoms while Maintaining scalp health. The shampoo incorporates active antifungal And keratolytic agents such as zinc pyrithione, ketoconazole, and Salicylic acid, in combination with natural extracts like tea tree oil and Aloe vera for enhanced soothing and moisturizing effects. The Formulation was assessed for physicochemical properties, pH Compatibility, stability, and antimicrobial activity against dandruff-Causing microorganisms. Clinical and user-based evaluations Demonstrated significant reduction in dandruff flakes and scalp irritation After regular use over a 4-week period. The results suggest that the Developed shampoo provides a balanced, effective, and well-tolerated Solution for dandruff management and scalp care.

INTRODUCTION

Herbal Shampoo –

Are probably the most widely used cosmetic products for cleansing Hairs and Scalp in our daily life Herbal shampoos are the cosmetic preparations That with the use of Traditional ayurvedic herbs are meant for cleansing the hair And scalp just like the regular Shampoo. They are used for removal of oils, dandruff, environmental pollutions etc. Shampoo is A type of cosmetic

mixture that uses herbs from plants as an alternative to the synthetic Shampoo Available in the market. The herbal shampoo is important, as people today prefer herbal products Than chemical ones for they proved to enhance. Shampoos are most probably used as cosmetics. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents Containing suitable additives preservatives and active ingredients. It is a harmless, chronic Condition that occurs when scalp becomes dry or greasy and produces white

***Corresponding Author:** Rohit Panage

Address: DJPS College of pharmacy, Pathri.

Email ✉: panagerohit20@gmail.com

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flakes of dead skin That appear in hair or on shoulders. People most often think of it as anything that produces a Flaky scalp. A good shampoo should almost immediately form abundant foam irrespective of the Type of water used or the nature of soil or fat to be removed from hair. Concept foam formation Is not released to the cleansing effect, but people psychologically always prefer a high foam Product.(1) Shampoo is defined a it is a hair care product and preparation of surfactant in suitable form of Liquid, solid or semisolid used d is for removal of oil diet skin particle, dandruff, environmental Pollutanes and other contaminated particle that gradually build in hair. The shampoo is mostly Used as cosmetics product. The objective of preparation is to remove unwanted build up without Stripping so much sebum as to make hair is unmanageable. The shampoo is most widely used as Beautifying agent and are viscous solution of detergent containing suitable additives, preservative Active ingredients.(2) Herbal cosmetics have a growing demand in the world market and are an invaluable gift of Nature. There is a wide range of herbal cosmetics products to satisfy your beauty regime, adding Herbal cosmetics is very safe for skin and hair. Human beings have been using herbs for Different purposes like food, medicine, and beatifying with the advancement of science & Technology use of natural things including plants has been reduced except for food, vegetarian Takes plant& plant only. However, there is a resurgence of the use of herbs both as drugs and Cosmetics.(3) Dandruff is a common disorder affecting the scalp condition caused by yeast *Pityrosporum*. Dandruff cannot be completely eliminated but can only be managed and effectively controlled. Symptoms of dandruff mainly include Presence of fragments, Itching of the scalp, and Redness Around the scalp. Dandruff can be treated in two ways. They include chemical based antidandruff Shampoo and herbal based

antidandruff shampoo containing antibacterial and antifungal Ingredients like ketaconazole, selenium sulphide, zinc pyrithione etc. The anti-dandruff shampoo Only slow down the scalp flaking and have their own disadvantages like loss of hair, increased Scaling, itching, irritation, nausea, headache, vomiting, photosensitivity. Herbal extracts Formulations are viable alternative to synthetic drugs. Now-a-days, many herbal shampoos are available in the market which contains herbal ingredients such as plant extracts and essential oils. In the present review we discuss about the causes, synthetic chemical, various herbs and the Evaluation parameters for the anti-dandruff shampoo.(4) The hair of the head has historically been associated with beauty and social distinction. Tienumerable instances from all the art forms can be cited supporting the special prominenced to The hair by people of virtually all times and cultures, Whereas the hair has been simmed, shaped And even coloured since the most ancient times, relatively little emphasis has seen placed on the Process of cleaning it. Only in this century has a real technology in the cleaning of the hair and Scalp developed. First come the mass distribution of cake soap and sanitary facilities make Bodily cleanliness and personal hygiene practice. Next came the specialization of branded Shampoo products for the hair and scalp, offered in multiplicity ofTypes and form snow, washing the hair and scalp with shampoo has become a nearly universal Practice. Shampoos are probably the most widely used hair products today, based on synthetic Ingredients as well as herbal ingredients Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning Scalp and hair in our daily life. Shampoos are most likely utilized as beautifying agents and are a Viscous solution of detergents containing suitable additives preservatives and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The Purpose of

using shampoo is to remove dirt that is build up on the hair without stripping out Much of the sebum. Many synthetic shampoos are present in the current market both medicated And non medicated, however, herbal shampoo popularized due to natural origin which is safer, Increases consumer demand and free from side effects. In synthetic shampoos, surfactants (synthetic) are added mainly for their cleansing and foaming property, but the continuous use of These surfactants leads to serious effects such as eye irritation, scalp irritation, loss of hair, and Dryness of hairs (5)

1.1 History Of Shampoo:-

In the Indian subcontinent, a variety of herbs and their extracts have been used as shampoos Since ancient times. The first origin of shampoo came from the Indus valley civilization. A very Effective early shampoo was made by boiling sapindus with dried Indian gooseberry (amla) and a Selection of other herbs, using the strained extract. Sapindus, also known as soapberries or Soupnuts, a tropical tree widespread in India, is called ksuna in ancient Indian texts and its fruits Polp contains saponins which are a natural surfactants. The extract of soapberries creates a lather Which Indian text called phenaka. It leaves the hair soft, shiny and manageable. Other products Used for hair cleansing were Shikakai (Acacia Concinna), Guru Nanak, the founder and the first Gora of Sikhism, made references to soapberry tree and soap in the 16th century. Cleansing the Hair and body massage (champu) during one's daily bath was an indulgence of early colonial Traders in India. When they returned to Europe, they introduced the newly learned habits, Including the hair treatment they called shampoo (6)

1. Herbal Shampoo

Herbal shampoos are the cosmetic preparations that with the use of traditional ayurvedic herb Meant for cleansing the hair and scalp just like the regular shampoo. They are used for removal of oils, dandruff, dirt, environmental pollutions etc. Shampoos are arguably the most common cosmetics items used in daily life to clean the hair and scalp (6)

Herbal shampoos are cosmetic products that clean the hair and scalp in the same way as ordinary shampoo by utilising traditional ayurvedic herbs. They are employed to remove oils. Dirt, pollution of the Environment, etc. Herbal shampoo is a type of cosmetic product that utilises plant-based herbs as an alternative to commercially available synthetic shampoo. The use of herbal shampoo is crucial since modern consumers choose natural over synthetic goods because they have been shown to improve health. Herbal cosmetics are becoming more and more popular, in part because it is thought that they are risk-free and have no adverse effects.

1.2.1 Need For Shampoo :-

The skin on our heads secretes a greasy substance called sebum that coats the whole surface of the head to protect the hair. Although it gives the hair a healthy sheen, when secreted in big amounts, it makes the hair appear unclean.(7)

1.2.2 Requirements of Shampoo: -

1. It should be nontoxic and non-irritating to the hair and scalp.
2. It should remove sebum and atmospheric pollutants from scalp hair.
3. It should be easily removed on rinsing with water.
4. It should deliver an optimal level of foam to satisfy the expectations of the user.



5. It should remove the residues of previously applied hair styling lotions and sprays.

1.2.3 Benefits of herbal shampoo :-

1. It provides shine to hairs.
2. Also minimizes the loss of hairs.
3. Provides a long lasting natural colour to hairs.
4. It must include all natural ingredients and is chemical free.
5. It wont irritate skin or scalp.

1.2.4 Ideal Properties of Herbal Shampoo :-

1. It should effectively and completely remove dust or entrapped mater
2. It should produce a good amount of foam that will satisfy physiology
3. It should be easily removed on rinsing with water.
4. It should not make hands rough and chapped.

1.2.5 Advantages of Herbal Shampoos :-

1. It includes all pure and organic ingredient.
2. It is free from all kind of side effects.
3. It doesn't include surfactant like SLS
4. No animal testing
5. It must be skin friendly.(8)

1.2.6 Limitations of Herbal Shampoo:

1. Natural products affect product uniformity, Quality control.
2. Less stable so, preservatives should be added.
3. Seasonal variation of plant constituents.

4. Some herbs are to scalp. Ex: lemon, menthol, Peppermint and papaya etc.

1.2.7 Functions of Shampoo:-

1. To make the hair smooth and shiny.
2. Produce good amount of foam.
3. Should not cause irritant to scalp, skin and eye.
4. Should completely, effectively remove dirt.
5. Impart pleasant fragrance to hair.
6. It should effectively and completely remove dirt or soil.
7. It should effectively wash the hair.
8. It should produce a good amount of foam to satisfy the user
9. It should be readily removed by rinsing with water.
10. It should impart a pleasant fragrance to the hair.
11. It should not have any side effects or causes irritation to the skin and eye. (9)

1.2.8 Types of Shampoo

1. Liquid shampoo
2. Solid cream shampoo
3. Jelly shampoo
4. Powder shampoo
5. Lotion shampoo
6. Aerosol foam shampoo
7. Specialised shampoo:
8. Conditioning shampoo



9. Antidandruff shampoo

10. Baby shampoo

11. Two layer shampoo.(10)

Dandruff: -

Dandruff is the major cosmetic problem & great public concern both in developed developing Countries. The word dandruff is combination of “ten “meaning Letter and meaning ‘dirty Dandruff is a chronic scalp condition leading to scaling itching redness of by shedding epidermal Cell. Scalp sheds dead cells in nearly invisible way but sometimes shed as visible flakes called Dandruff. In physiological spectrum of sealing about 487500 cell/smart released after detergent Treatment. Many herbal shampoos available in market contains herhal ingredients such as plant Extracts and essential oil Tulsi, Henna, Neem, Lemon, shikakai are commonly used plants in Shampoo formulation of which some how anti-dandruff activity, The goal of using shampoo is to Remove the unwanted build up in between the hair without stripping out so much sebum as to Make hair unmanageable Shampoo is generally made by combining surfactant, most often Sodium lauryl sulphate with a co-surfactant, most often propyl in water. Synthetic shampoo may Cause side effects so keeping this in view an Herbal anti-dandruff shampoo has been formulated And evaluated scientifically. In Indian system of medicine, various plants its parts have been usedfor treatment of dandruff such as Tulsi, Henna, Neem, Lemon, shikakai. Traditionally, single plants have been used &there was no scientific report available regarding totally all ingredients are natural regarding usage of such combination that we have conceived

Type of Dandruff

I) Dry Skin dandruff:-

II) Oily skin dandruff-

III) Fungus related dandruff:-

I |Dry Skin Dandruff:-

It is also called as pityriasis simplex characterize by excessive formulation of minute scales which accumulate on the scalp area. In this type of dandruff there is no excessive hair loss. The inflammation on the skin no observed. The scales are first found in middle of the scalp and then spread of frontal, parietal and occupational areas.



Fig. Dandruff

II| Oil Related Dandruff: -

Oil related dandruff happen when there is an accumulation of sebum oil on the scalp. It is mostly Found in young men following puberty. Inflammation of varied intensity developed on the scalp Along with oily scales of dirty yellow colour. Hair fall is mostly found in this condition. The Most common site affected by this type of dandruff is scalp, behind the ears, over breast bone Armpits. Oume high amount of serum oil secretion leading to the condition flakes. Stress & Anxiety level cause champs all dead skin. And dirt forming itchy flakes. Stress and anxiety level Cause high amount of sebum oil secretion leading to the condition.



Fig No 1.2 Oil Related Dandruff

III) Fungal Dandruff:-

Fungal dandruff Fungal is a natural component found on skin and scalp. This fungus survive on excessive oil (11)



Fig no 1.3 Fungal Dandruff

1.4.1 Anatomy And Physiology of Hair:-

LAJ Human Hair

Human hair has about 65-95% of its weight in proteins, extra 32% of water, lipid Pigments and Different components. Chemically, about 80% of human hair is shaped via a protein regarded Oume high oil secretion leading to the condition flakes. Stress & anxiety levelAmount of serum as keratin,

With a excessive grade of sulfur. Keratin is a laminated complicated Fashioned with the aid of distinctive structures, which offers the hair strength, flexibility, Durability, and performance The physicochemical homes and form of the hair is the direct end result of the Corporation of its A range of structural elements, proteins being the most significant. Hair Shape is described in the Hair.

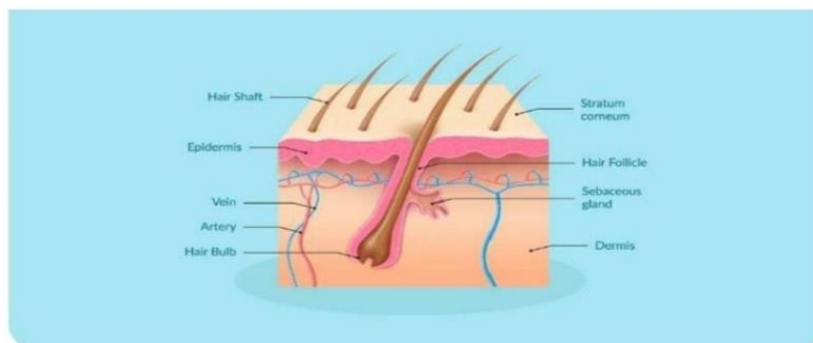


Fig No 1.4 Structure of Hairs

Shar epidermis vein artery hair both stratum corneum hair ficle setiaceous klarul Each hair has a hair shaft and a hair root. The shaft is the seen section of hair that stick out of the skin. The hair root is in the pores and skin and extends down to the deeper layers of skin. It is surrounded by means of the hair follicle (a sheath of pores and skin and connective tissue), which is additionally related to a sebaceous gland. Each hair follicle is connected to a tiny muscle arrector pili that can make the hair stand up. Many nerves feel hair motion and are touchy to even the slightest draft. At the base of the hair, the hair root widens to a spherical hair bulb. The hair papilla, which elements the hair root with blood, is discovered interior the backside of the hair bulb. New hair Cells are continuously being in the hair bulb, shut to the papilla. New cell are continuously Forming in hair bulbs, the cell Stick collectively and hurden. The full strand of hair develops From this team of hurdened hair cells. Because new hardened cells hold on attaching to the hair From below, it is progressively pushed up out of the skin. In this way, a single hair on your head Grows at a fee of about 1 cm per month. The shade of the hair is decided by means of the quantity of melanin in the hardened Cells. This Can fluctuate a lot from character to person and it adjustments over the Direction of a lifetime. The quantity of melanin typically decreases as human beings get Older, and greater air receives Trapped

inner the hair it then loses its color and turns White. Depending on someone's authentic Hair shade and the variety of white hairs that Develop, the hair on their on their head then turns Grey or white (12)

1.4.2 Structure of Hair –

A hair is composed of columns of dead, keratinized cells welded together. The shaft is a Superficial portion of the hair, which projects from the surface of the skin. The shaft of straight Hair is rounded in a cross-section, that of wavy hair is oval and that of woolly hair is elliptical or Kidney-shaped. The root is the portion of the hair deep into the surface that penetrates the dermis And sometimes into the subcutaneous layer. The shaft and root both

1.4.3 Consist of three concentric layers-

a) Medulla

It is the central part of the shaft and is generally noticeable in thick hair. It is composed of two or Three rows of polyhedral cells containing pigment granules and air spaces

b) Cortex

It is located peripheral to the medulla and forms the major part of the shaft. It consists of Elongated

cells, containing pigment granules in dark hair while the air in white hair

c) Cuticle

It is the outermost layer of the hair and consists of a single layer of thin, flat cells, which are Heavily keratinized.(13)

1.5 Hair Growth Cycle

Hair grows from the follicle, or root, underneath the skin. The hair is 'fed' by blood vessels at the Base of the follicle, which give it the nourishment it needs to grow. Between starting to grow and Falling out years later, each hair passes through four stages: anagen, catagen, telogen and exogen (Fig. 5.3). Another stage kenogen, has been recently realised. Every hair is at a different stage of The growth cycle. Over time, the length of the anagen stage decreases. Therefore, the hair may Become weaker and thinner after each cycle. That is why it is important to ensure diet rich in Specific nutrients to maintain normal, healthy hair growth. If hairs enter the resting phase too Early, excess shedding and noticeable thinning of the hair can occur (14) The hair growth happens in a cyclical process in hair follicles.

The cycle consists of four phases:

- 1) Anagen (hair growth)
- 2) Catagen (transition)
- 3) Telogen (Resting)
- 4) Exogen (hair shedding)

1. Anagen (Hair Growth) Phase

The anagen or growing phase is the first part of the hair growth cycle. During this Phase, cells of The bulb divide rapidly, resulting in new hair growth. 80-90% of Hair follicles are in the anagen Phase at any given time. The anagen phase lasts for 2-7

years. The length of the anagen phase Determines. The maximum hair length. For example, people with very long hair have a very Long anagen phase. Eyelashes, eyebrows, and body hair have shorter growth phases. Than for the hair on head, which is why they are much shorter than scalp hair. There are many Factors that influence the length of the anagen phase, including Genetics, nutrition, age and Overall health.

2. Catagen (Transition) Phase:-

The catagen or transition phase follows the anagen phase. This short, transitional Phase lasts for Only 2-3 weeks. During the catagen phase, the hair stops growing and detaches itself from the Blood supply. The hair becomes club hair.

3. Telogen (Resting) Phase:-

The telogen or resting phase follows the catagen phase. During the telogen phase, The club hair Rests while a new hair begins to grow beneath it. This new hair eventually takes the place of the Club hair. The telogen phase lasts for 3 months, And 10-15% of all hair are in this phase at any One time.

4. Exigent (Hair Shedding) Phase:-

The exogen or shedding phase is the last part of the hair cycle. During the Exogen phase, the Resting club hair detaches and falls out. Every hair eventually sheds, and it's completely normal To lose 50 to 100 hair each day. After the exogen phase, the follicle then returns to the anagen Phase and the cycle Repeats (15)

AIM AND OBJECTIVE:-

3.1 AIM:-Formulation and Evaluation of Herbal Anti-Dandruff Shampoo.

3.2 OBJECTIVE:



The present work is oriented at the synthesis of herbal anti-Dandruff hair formulation and the estimation of its various aspect

- Collection of Herbal Crude Drugs.
- Extraction of Herbal Crude Drugs.
- To Formulate Anti-dandruff Herbal Shampoo.
- To Evaluate Anti-dandruff Herbal Shampoo.

■ MATERIAL AND METHOD:-

A. Materials:-

1] Shikakai (Acacia Concinna):-

Shikakai also known as Shika in Tamil, Seekaaya in Telugu, and Soap pod in English, is a Powerful ayurvedic plant that has been used for generations as a cleanser for healthy. Long hair, Dandruff management and relief in skin diseases. Shikakai, also known as *Acacia concinna* in scientific terms, is a shrub-like tree native to Central India. *Acacia concinna* (Leguminosae), a climbing shrub with oblong-shaped dark brown pods, Bipinnate leaves, and pink flowers. It is typically found in the Indian subcontinent's tropical Woods.

Synonyms:-Shikakai, Satala.

Family: Mimosaceae.



Therapeutic Uses of Shikakai:

Shikakai is a plant that is used in India to treat long hair, dandruff, and skin disorders. This herb has been discovered to have activity to treat constipation, jaundice, gum infections, leprosy, malarial fever and ingredient of contraceptives. Shikakai is also known to have many medicinal properties. These include Anti-dandruff, Wound healing. Anti- hair fall properties. Anti-inflammatory, Antifungal activity, Antibacterial activity. Anti- oxidant activity. Hair growing property.(17)

2 |Aloe vera

Calms an itchy scalp deep cleans oily hairs. Strengthens Aloe vera contains proteolytic enzymes which repairs dead skin cells on scalp. Promote hair growth Smooth natural curls Reduce frizziness Detangle Hairs. (18)

Synonyms: -Aloe, Kewar Gandal

Family: Asphodelaceae

Biological source:-

Aloe is obtained from the dried juice of the leaves of *Aloe barbadensis* Miller, known as Curacao aloe, (*Aloe Vera*) *Aloe perryi* Baker, known as Socotrine aloe. *Aloe ferox* Miller and hybrids of this species with *Aloe africana* Miller and *Aloe spicata* Baker, Known as Cape aloe



3] NEEM:-



Neem is a natural herb that basically derives from the Neem tree, other names are: Azadirachta indica, Family: Meliaceae. Neem is best known for its pesticide and insecticide effects. Treating dermatitis. It is also used in dental and hair products. It is used for the treatment of: Asthma, Constipation, Cough. Stomach ulcer, Urinary tract infections. According to Ayurveda, Neem is best known for promoting hair growth, reducing hair loss, providing shiny, voluminous and healthy hair follicles. It is also used as a scalp nutrient.



Synonym: Melia azadirachta

Biological sources: It consists of leaves and other aerial parts of Azadirachta indica.

Family: -Meliaceae.

Chemical constituents:

The active ingredients are Azadirachtin, Salannin and Meliantriol. Neem leaves contain Nimbosterol and Quercetin. Seeds contain Azadirachtin, Salanin, Meliantrol.

And Meliacin. The trunk bark contains Nimbin, Nimbinin, Nimbidin, Nimbosterol and a bitter Principle called Margosine. Neem oil contains chiefly glycerides of Oleic (50%) and stearic (20%) acids.

BENEFITS OF NEEM:-

a) Anti-dandruff:

Neem oil contains the active ingredient Nimbidin. Nimbidin helps suppress inflammation which makes it useful in treating irritation of the scalp. It is an antifungal agent. Stops the growth of yeast on the scalp, which causes dandruff.

b) Anti-lice

Researchers found that Neem seed extract kills lice that were present in the hair after 5-10 Minutes of treatment. This may be due to the Azadirachtin oil content. Azadirachtin can bind the growth and egg-laying of insects by interfering with their hormones.

c) Condition the scalp:

Neem oil soothes irritated scalp and provides relief from inflammation and itching, a side effect of dandruff. Contains various fatty acids (linoleic acid, oleic acid and stearic acid), all used for hair nourishment. It also restores dry, damaged, poorly nourished and coarse or brittle hair.

d) Stimulates Hair growth:

Neem oil has regenerative properties i.e. it helps hair regrowth. It is a great way to aid hair growth by increasing blood circulation and stimulating the hair follicle to increase and encourage hair growth. The anti-inflammatory, antioxidant and antibiotic properties help in the prevention of baldness.

CONCLUSION: -

The present study successfully formulated and evaluated an herbal anti-dandruff shampoo using natural ingredients known for their antifungal, antibacterial, and cleansing properties. The selected herbs—such as neem (Azadirachta indica), hibiscus (Hibiscus rosa-sinensis), reetha (Sapindus mukorossi), shikakai (Acacia concinna), and aloe vera (Aloe barbadensis)—demonstrated significant potential in reducing

dandruff while maintaining hair and scalp health. The formulated shampoo exhibited acceptable physicochemical characteristics, including good foaming ability, appropriate pH (within the range of 5.0–7.0), effective cleansing action, and pleasant organoleptic properties. Microbial analysis and stability studies confirmed the product's safety and shelf life. Furthermore, comparative evaluation with commercial shampoos indicated that the herbal formulation was both effective and mild, with minimal side effects. In conclusion, the herbal anti-dandruff shampoo developed in this study offers a natural, safe, and eco-friendly alternative to synthetic formulations, making it a promising candidate for commercial production and further clinical evaluation.

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