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# FORMULATION AND EVALUATION OF HERBAL SHAMPOO

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## ABSTRACT

The primary objective of this research is to formulate and evaluate a herbal shampoo, as well as to find out its physicochemical performance with a focus on product safety, efficacy and quality. Herbal shampoo is a natural hair care solution that removes grease, dirt and dandruff and promotes hair growth, strength and thickness. It also gives softness, smoothness and shine to the hair. Shampoo for cosmetics is made up of different types of drugs. Hair loss, increased scaling, itching, pain, nausea and headache are some of the negative effects of these drugs. Consequently, efforts are being made to produce herbal shampoos that are free from adverse effects. The main objective of this study was to remove harmful synthetic ingredients from the formulation of shampoos and replace them with safe natural ingredients.

Keywords: Aloe vera, Cosmetic, Herbal shampoo, Dandruff, Acasia concinna, Sapindus mukorossi, Hibiscus rosa-sinesis, Azadirachta indica and Glyccerrhiza glabra.

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN SCIENCE, COMMUNICATION AND TECHNOLOGY
ISSN 2581-9429 IJARSCT

## INTRODUCTION :-

An essential component of human beauty is hair. Human hair has several functions, including sebum production, apocrine sweat, pheromonas production, thermoregulation, and defense against environmental aggressors. The main purpose of hair care products is to clean the hair. Additionally, it changes the texture of the hair, nourishes it, and gives it a healthy appearance.

The most popular hair care product is shampoo. It can be used to clean hair and scalp of grime, leftover hair style product residue, and environmental contaminants. It comes in both viscous liquid and powder form. Shampoos used to just be used to clean the hair and scalp, but modern shampoos are considerably more versatile. It is effortless to use and leaves the hair shiny, manageable, and easy to comb after cleansing. These days, a large variety of shampoos with various purposes are sold in the market, including synthetic, herbal, medicated,

and non-medicated shampoos. The most well-liked herbal shampoos are those that seem to have superior purity, safety, and effectiveness.

Similar to ordinary shampoo, herbal shampoos are made with natural components and are intended to clean hair and scalp. These shampoos have good stability, are less damaging than synthetic shampoo, and have no adverse effects because no surfactants are used. Surfactants are present in synthetic shampoo. Serious side effects, such as split ends, eye irritation, hair loss, drying out, and graying of the hair, can result from using these surfactants over an extended period of time. Because herbal, medicated, and non-medicated shampoos on the market these days, but customers are becoming more and more interested in herbal shampoo because they think that since it comes from natural sources, it is safe and doesn't have any negative effects. Shampoo contains synthetic surfactants mainly for foaming and cleaning purposes; nevertheless, prolonged usage of these surfactants can cause hair loss, scalp discomfort, and eye irritation. Herbal shampoo recipes are thought to be an alternative to synthetic ones, but making cosmetics with just natural ingredients is challenging. Numerous medicinal plants are frequently utilized in shampoo formulations because of their purportedly therapeutic benefits

FORMULATION AND EVOLUTION OF HERBAL SHAMPOO

on hair.

These plant components can be utilized in derivative, refined extract, powdered, or crude form. Making a herbal shampoo with just one natural ingredient that is as safe and mild as a synthetic one while still competing well in terms of foaming, detergency, and solid content is really challenging. As a result, we thought about creating a pure herbal shampoo using plants that are widely and historically used in Oman and the Gulf, particularly India, for hair cleaning. For millennia, the Indian folklore system has employed the pericarp of Spindus mukorossi, also known as soapnut or reetha, the fruits of Phyllanthus emblica, also known as Amla, and the dried pods of Acacia concinna (Sheekakai) to wash hair (Kapoor, 2005). Because Reetha and Sheekakai have a high saponin content, they create a rich lather when shaken with water. Additionally, they have been shown to have positive effects on the skin and other organ systems. Amla fruit, which is high in vitamin C, is used in hair treatments as a strengthening agent, anti-dandruff agent, and hair growth stimulator. The Ziziphus spina-christi tree, known as Sidr in Arabic, is indigenous to the Middle East including Oman, and its leaves are traditionally used by women to

wash, darken and lengthen hairs . It is reported to contain four saponin glycosides that help in removing excess sebum without causing adverse reactions . Saponins also exhibit antibacterial and antifungal activities that make them important ingredients of cosmetic applications.

**HISTORY :**

Hans Schwarzkopf created the original liquid shampoo in 1927, which was still referred to as "soap." Liquid has been the most widely used form factor for hair cleaning since 1927. Hans Schwarzkopf did not develop a soap-free liquid until 1933.

'Kneading' or'massaging' is the meaning of the Hindi phrase shampoo (often champi/Champy or champ), which is where the English word'shampoo' originates.

A herbal shampoo is formulated with natural oil, mineral, and Ayurvedic plant extracts. Shampoos that are high in chemicals can damage hair roots and result in a number of scalp-related problems. However, herbal shampoos can gently cleanse the scalp, restore any lost nutrients, and enhance the condition of hair.

Many herbs and their extracts have been used as shampoos on the Indian subcontinent from ancient times. The Indus Valley Civilization was the first source of shampoo.

The filtered extract from boiling Sapindus with dried Indian gooseberry (amla) and a few other herbs formed a very efficient early shampoo. The fruit pulp of the tropical sapindus tree, commonly referred to as soapberries or soapnuts and found throughout India, contains saponins, a naturally occurring surfactant. In ancient Indian scriptures, the sapindus tree is known as ksuna. Indian literature refer to the lather produced by soapberry extract as "phenaka." The hair is left manageable, lustrous, and silky after. Shikakai (Acacia concinna), hibiscus flowers, ritha (Sapindus mukorossi), and arappu (Albizzia amara) were additional treatments used for hair cleaning. In the sixteenth century, the founder and first Guru of Sikhism, Guru Nanak, mentioned soap and the soapberry tree.

Early Indian colonial traders indulged in body massages (champu) and hair cleaning during their daily baths. They brought the newly acquired habits,

including the hair treatment they termed shampoo, back to Europe when they arrived.

## Ideal characters of shampoo

• Should effectively and completely remove the dust, excessive sebum.

• Should effectively wash hair. Should produce a good amount of foam

• The shampoo should be easily removed by rinsing with water.

• Should leave the hair non dry, soft, lustrous with good, manageability.

• Should impart a pleasant fragrance to the hair.

• Should not make the hand rough and chapped. Should not have any side effects or cause irritation to skin or eye.

**Composition of shampoo**

• Principal surfactant

• Secondary surfactant Antidandruff agents

• Conditioning agents

• Pearlescent agents

• Sequestrants

• Thickening agents

• Colours, perfumes and preservatives.

**Types of shampoo**

• Liquid shampoo

• Solid cream shampoo

• Jelly shampoo

• Powder shampoo Lotion shampoo

Aerosol foam shampoo

- **REQUIREMENTS OF SHAMPOO:-**

• It should remove sebum and atmospheric pollutants from scalp and hair.

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

It should deliver an optimal level of foam to satisfy the expectations of the user

• It should be nontoxic and non-irritating to the hair and scalp.

- **Specialized shampoo□**

• Baby shampoo

• Anti-dandruff shampoo

• Conditioning shampoo

• Two-layer shampoo

- **ANTAMONY OF HAIR :□**

The hair is made up of 95% keratin a fibrous, helicoidal protein (shaped like a helix) that forms part of the skin and all its attachments (body hair, nails etc.). The hair structure consists of 3 different parts:

• Medulla: It is the innermost layer of the hair shaft, made up of an amorphous, soft, oily substances.

• Cuticle: Thin protective outer layer that contains nutrients beneficial for hair growth. It is highly keratinized with cells shaped like scales

Cortex: It is the main constituent of the hair, containing long keratin chains which gives elasticity, suppleness and resistance to the hair. The cells of the cortex are joined together by an intercellular cement rich in lipids and proteins.

- **GROWTH CYCLE OF HAIR :**

Hair growth cycle consists of four phases:

• **Anagen (growth phase):** It is the growing phase. This phase lasts for several years.

• **Catagen (transitional phase):** during this phase the hair follicle shrinks and hair growth slows.

• **Telogen (resting phase):** It is the resting phase where hair growth stops and new hair begins the growth phase, pushing the old hair out.

• **Exogen phase:** last phase of hair growth cycle where hair strand completely detaches from the scalp and sheds off


**Fig.No.1 Hair structure**

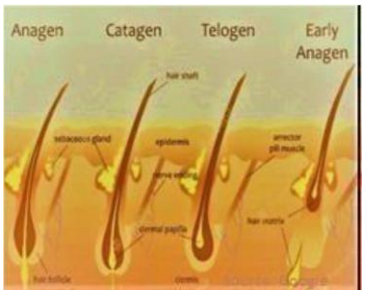


**Fig.No.2 Growth cycle of hair**

- **HAIR PROBLEMS**:-

• **HAIR LOSS**: The main reason behind the hair loss is Stress, medication, changes in hormone and many hair styling products can contribute to hair loss.

• **OILY HAIR/GREASY HAIR:** Oily hair is caused by excessive production of natural oil (sebum) by the scalp. Sebum is produced by sebaceous glands which sometimes "work overtime'' leading to excessive amount of oil.

• **DANDRUFF:** Dandruff is a non-inflammatory harmless skin condition that affects scalp and might result in hair loss. It is scaly and adheres to the root of the hair.

**DRY HAIR:** Dry hair occurs due to deficiency of proteins in the diet. Menopause, anemia, hormonal imbalance, birth control pill can also lead to dry hair.

• **SPILT ENDS**: Splits ends occur when the hair ends dry and other reasons are exposure to extreme weather conditions. Hair care techniques such as straightening and curling and chemical hair products may cause spilt ends.

**MATERIAL COMMONLY USED IN HERBAL SHAMPOO :**

| Botanical name | Common name. | Functions/uses | Figure |
|---|---|---|---|
| Lawsonia Inermis | Henna | Promotes growth of hair, conditioner |  |
| Azadirac htaindica | Neem | Antimicrobial agent, Prevents thedryness of hairsand flaking ofhairs. |  |
| Ocim um sanctu m | Tulsi | Antimicrobial andanti- lice property |   |

| | | | |
|---|---|---|---|
| Embeli ca officina lis | Indian gooseber ry/amla | Promotes hair growth, prevents premature greyingand controls dandruff. |  |
| Acaci a concin na | Soap p od/ Shikakai | Retains natural oilof hair, keeps hair lustrous & healthy. |   |

| | | | |
|---|---|---|---|
| Aloe barbadensis | Aloe vera | Conditioning & moisturizing effect. |   |

| | | | |
|---|---|---|---|
| Citrus lemon | Lemon | Maintains the pH & imparts fragrance to preparation |   |
| Hibiscus rosa sinensis | China rose | Prevents hair loss and hair growth promoter |  |

| | | | |
|---|---|---|---|
| Sapindus mukorossi | Soap nut/ Reetha | Detergent and antidandruff. |   |

| | | | |
|---|---|---|---|
| Trigonella foenum graceum | Fenugreek | Cleansing and softening. |   |
| chrysopogon ziznaniodes | Vetiver grass | Antifungal, Antimicrobial |  |
| Zingiber officinalis | Ginger | Promotes hair growth. |  |

| | | | |
|---|---|---|---|
| Eclipta prostrata | Bhringraj | Hair tonic |  |
| Withania somnifera | Ashwagandha | Controls hair fall, promotes hair growth, improves circulation of thescalp. |  |
| Camellia sinensis | Green tea leaves | Hair growth and enrichment |   |
| Bacopa monnieri | Brahmi | Supports the hairgrowth |   |

**Benefits :**

- Stimulates the scalp for healthy hair growth
- Helps to add strength and elasticity to dry and brittle strands
- Helps hair to become less prone to breakage
- Helps build hair's resilience to protect from future damage, breakage and split ends
- Leaves hair shiny, soft and manageable
- Lowers Risk Of Side Effects. Herbal supplements are well tolerated by people who are allergic to components in prescription drugs.
- Symptomatic Relief.
- Cost Effective.
- Readily Available.
- Treats Chronic Conditions.
-

## AIM and OBJECTIVE

### Aim :

To Formulate and Evaluate a Shampoo using natural herbs.

### Objective :

Primary Objectives:

1. Develop a safe and effective herbal shampoo: Formulate a shampoo using natural ingredients that is gentle on hair and scalp.
2. Evaluate the efficacy of herbal shampoo: Assess the cleansing, nourishing, and protective properties of the herbal shampoo.

Secondary Objectives:

1. Improve hair health: Enhance hair strength, shine, and manageability.
2. Reduce dandruff and other scalp issues: Soothe and calm the scalp, reducing irritation and flaking.
3. Promote hair growth: Stimulate hair growth and reduce hair fall.

# LITERATURE REVIEW

1) **American Heritage Dictionary of the English Language, 4th Edition, See Shampoo; Also see Shampoo. Hobson-Jobson (1903), University of Chicago.**
**Abstract:**
A Glossary of Colloquial Anglo-Indian Words and Phrases" is a well-known work of Anglo-Indian lexicography, originally published in 1886 by Henry Yule and A.C. Burnell. A revised and updated edition was published in 1903, edited by William Crooke. The 1903 edition, edited by William Crooke, is available online through various libraries and archives. It's a significant resource for understanding the evolution of Anglo-Indian English and the influence of Indian languages on English during the British colonial period.

**2) kSuNa, Sanskrit Lexicon, Monier-Williams Dictionary (1872)**
**Abstract**:
1. Kauna: A term potentially related to a specific plant or concept.
2. Sanskrit Lexicon: A reference to Sanskrit language dictionaries or resources.
3. Monier-Williams Dictionary (1872): A renowned Sanskrit-English dictionary compiled by Sir Monier Monier-Williams.

This dictionary is a valuable resource for understanding Sanskrit terms, including those related to:

1. Botany
2. Ayurveda
3. Hinduism
4. Indian culture

**3) eltscher, Kate (2000). "The Shampooing Surgeon and the Persian Prince: Two Indians in Early Nineteenth-century Britain". Interventions: International Journal of Postcolonial Studies. 2 (3): 409–23. doi:10.1080/13698010020019226. S2CID 161906676.**
**Abstract:**
India Inscribed: European and British Writing on India, 1600-1800* (1995): A book exploring European and British writings on India.
- The High Road to China: George Bogle, the Panchen Lama, and the First British Expedition to Tibet (2006): A historical account of George Bogle's expedition to Tibet, praised for its engaging narrative and insightful analysis.
- Palace of Palms: Tropical Dreams and the Making of Kew (2020): A book about the making of Kew Gardens, recognized as a Times and New Statesman Book of the Year.
- Hobson-Jobson: The Definitive Glossary of British India: An edited version of this glossary, showcasing her expertise in colonial writing and lexicography.

**(4)Diaz, Eden C. (1990). Home Economics, Practical Arts and Livelihood Education for College: Book Two. Rex Bookstore, Inc. p. 75. ISBN 978-971-23-0795-9. Retrieved 18.**

**Abstract:**

India has become a dumping ground for the products which are banned in Europe and USA,whether it is FMCG products or popular drugs. One such thing is shampoo with harmful chemical ingredients,some of the popular shampoo brands available in Indian market contain ingredients dangerous for our health.Ingredients found in these shampoo brands may pose a threat to our health.Research has shown that various chemicals lurking inside popular shampoo brands may induce serious health risks, like memory loss, eye and skin irritation, hair follicle damage that can lead to hair loss, and even cancer.Propylene glycol is main ingredient of shampoo. It can cause allergic reactions.Sodium lauryl sulfate and ammonium lauryl sulfate are common causes of eye irritation as well as cancer. They can also damage hair follicles. When absorbed into the body from continuous contact, they can bring on asthma attacks. Synthetic fragrances contain hundreds of chemicals, some of which have been known to cause headaches, dizziness, rash, hyper pigmentation, coughing and vomiting. Diethanolamine (DEA ) is readily absorbed through the skin and can also be toxic to the brain. KALON LUEUR AD Shampoo, A Revolutionary Approach to provide nutritive solution to hairs with new age nanocosmeceutical technology developed by scientists of pugos nutrition research centre Hyderabad with NO harmful chemical ingredients with new age nanocosmeceutical technology provides nutritive healthy solution to hairs

**5)Kothari S, Patidar K, Solanki R. Polyherbal Anti-Dandruff Shampoo: Basic Concept, Benefits, and Challenges. Asian J. Pharm. 2018; 12(3): S849- 58**

**Abstract:**

The objective of this review article is to provide information about various herbs used in dandruff treatment along with causes and remedies of dandruff formation. This article also highlights the benefits of herbal shampoo over synthetic shampoos. The hair is an integral part of the way to feel about the self-appearance, and when the hairs are lost, it can be damaging to self-esteem and self-confidence. One common reason is dandruff; a very common scalp disorder with high prevalence in population is caused by numerous host factors in conjunction with Malassezia furfur. Most of the commercially available anti-dandruff hair shampoos contain some form of antifungal agents that appear to reduce the incidence of the disease. Synthetic product has poor efficacies, more side effects, and gives scope for recurrence of symptoms. As the scalp is one of the most absorbent parts of the body, products applied to the scalp go directly to the blood, without being filtered in any way. Hence, it is very important to know and understand the effects of ingredients used in shampoo formulations

**6) Ankule A, Wani S D, Murkute P M, Pundkar A S. Multipurpose herbal powder shampoo. World j. pharm. life sci. 2020; 6(5): 166- 182.**
**Abstract:**
marketed powder shampoo contains many natural ingredients with an emphasis on safety and efficacy, which will avoid the risk posed by chemical ingredients. It clears dirt, dandruff, promote hair growth. strengthens. and darken the hair. morever, it also act as a conditioning agent and performs all these actions without affecting or damaging hair. The hearb amala, bhringaraj, hibiscus, shkakai, and ginger have been selected to formulate the herbal shampoo powder on the basis of the traditional system and scientific justification with modern use The major objective of the present study was to formulate an herbal shampoo powder by means of eliminating harmful synthetic ingredients and substitute them with natural ingredients. It is very difficult to get all the properties in one substance. Thats why we makes this product unique is that we have made a quality powder shampoo with different properties. Such as anti dandruff, antibacterial, hair growth promoter, conditioner, give smoothen hairs, reduce hair fallor dead skin, etc. The main couse of dandruff is usually a fungus called "Pityrosporum ovale" (P.ovale) which is a naturally occurring yeast - like organism found most on the scalp and other part of the human skin. The fungus is found most on skin areas with plenty of sebaceous glands : on the scalp where large no of sebaceous glands can be found hence chances of dandruff in haire is more as compare to other body part. The reason of hair problem are tension, scalp infection, harmone disturbances, lowers vitamin, food, minerals, and large chemical shampoos are used. To overcome all this problems it was the main aim of our project, so we prepared multipurpose powder herbal shampoo for hair treatment.

**7) Joshi N, Patidar K, Solanki R, Mahawar V. Preparation and evaluation of herbal hair growth promoting shampoo formulation containing Piper betle and Psidium guajava leaves extract. Int. J. Green Pharm. 2018; 12(4): S835- 39.**
**Abstract:**
Antioxidants are helpful in increasing the blood circulation and thus help in hair growth as well as in the treatment of diseases. Alopecia is a dermatological disorder with psychosocial implications on patients with hair loss. The antioxidant property of plant and different herbs can be utilized in hair fall conditions or many diseases. Aim: The aim of this study is to develop an herbal hair growth promoting shampoo using Piper betle and Psidium guajava leaves extract due to their antioxidant property. Materials and Methods: Antioxidant activity of herbal shampoo formulation containing P. betle and P. guajava leaves extract was determined using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) method, 0.5 ml of each sample at various concentrations was added to 1.5 ml of DPPH (0.004%) solution and allowed to stand in the dark at room temperature for 20 min. The absorbance at 520 nm was recorded using UV spectroscopy which was compared with ascorbic acid taken as standard. Results: The results of the study demonstrated that formulation FC 3 exhibited best antioxidant activity and formulation was stable for 2 months. The formulation FC 3 shows better pH, foamability, dirt dispersion, and wettability

**8) Pundkar A S, Ingale S P. Formulation and evaluation of herbal liquid shampoo. World J.Pharm. Res. 2020;9(5):901-11**

**Abstract:**

uid or cream preparation of soap or detergent to wash the hair is called as shampoo. Shampoos are the products which removes surface grease, dust from the hair shaft and scalp. Shampooing is the most common form of hair treatment. Shampoos are primarily being products aimed at cleansing the hair and scalp. In the present scenario, it seems improbable that herbal shampoo, although better in performance and safer than the synthetic ones, will be popular with the consumers. A more radical approach in popularizing herbal shampoo would be to change the consumer expectations from a shampoo, with emphasis on safety and efficacy. The main objective of this study was to eliminate harmful synthetic ingredient from herbal shampoo formulation and substitute them with a safe natural ingredient

**9) Haritha PN, Supraja P, Samreen S, Hrudayanjali, Qureshi M, Sandya P, Swetha T., A Review on Polyherbal Shampoo Powder. Int. J Pharm Res. 2021; 21(2): 346-63**

**Abstract**:

The shampoo sector is probably the largest unit among the hair care products. Shampoos are one of the cosmetic products used daily as the hair is a special and cherished feature of human being which beautifies the look of every individual. Day by day dependency of people is raising on herbal formulations not only for a chronic ailment but also for several acute problems. The assurance therapy with minimal side effects has been proven with ayurvedic formulations. In the scenario of changing food habits, stress, and dependent environment conditions, several hairs and skin disorders are encountered. In case of hair disorders like dandruff, hair fall, dull hair, split ends, etc, a proper selection of ayurvedic ingredients with the required amount, the dosage form can be formulated to fight against hair problems. This polyherbal shampoo was formulated by using natural ingredients like Aloe vera (Barbadensis miller), Neem leaves (Azadirachta indica), Reetha fruit (Sapindusmukurossi), Shikakai (Acacia concinna), Amla fruit (Emblica officinalis), Hibiscus leaves(Hibiscus rosa- sinensis) with proven efficacy. The combination of such ingredients has made it possible to secure highly effective dry powder shampoo. The formulation at laboratory scale was evaluated for several organoleptic properties, general powder characteristics and physicochemical evaluation to ensure the safety and efficacy of the formulatio

**10) sales kinny (21 March 2014). "Thick, lush, sexy hair from drugstore products".**
**Philippine Daily Inquirer. Archived from the original on 25 March 2014.**
**Retrieved 18 June 2021.**
**Abstract:**
India has become a dumping ground for the products which are banned in Europe and USA,whether it is FMCG products or popular drugs. One such thing is shampoo with harmful chemical ingredients,some of the popular shampoo brands available in Indian market contain ingredients dangerous for our health.Ingredients found in these shampoo brands may pose a threat to our health.Research has shown that various chemicals lurking inside popular shampoo brands may induce serious health risks, like memory loss, eye and skin irritation, hair follicle damage that can lead to hair loss, and even cancer.Propylene glycol is main ingredient of shampoo. It can cause allergic reactions.Sodium lauryl sulfate and ammonium lauryl sulfate are common causes of eye irritation as well as cancer. They can also damage hair follicles. When absorbed into the body from continuous contact, they can bring on asthma attacks. Synthetic fragrances contain hundreds of chemicals, some of which have been known to cause headaches, dizziness, rash, hyper pigmentation, coughing and vomiting. Diethanolamine (DEA ) is readily absorbed through the skin and can also be toxic to the brain. KALON LUEUR AD Shampoo, A Revolutionary Approach to provide nutritive solution to hairs with new age nanocosmeceutical technology developed by scientists of pugos nutrition research centre Hyderabad with NO harmful chemical ingredients with new age nanocosmeceutical technology provides nutritive healthy solution to hairs.

**11) American Heritage Dictionary of the English Language, 4th Edition, See Shampoo; Also see Shampoo. Hobson-Jobson**
**(1903), University of Chicago.**
**Abstract**:
n the present study, herbal shampoo was formulated containing suitable ingredient such as Hibiscus rosa-sinensis, Emblica officinalis, Acacia concinna, Sapindus indica, Eclipta prostrata, Aloe barbadensis, and Cassia auriculata in different proportions to formulate and evaluate its physicochemical properties

**PLAN OF WORK :**

Herbal shampoos often utilize plants with beneficial properties for hair and scalp health. Some popular plants used in herbal shampoos include:

1. Aloe vera: Soothes and moisturizes the scalp.
2. Neem: Known for its antifungal and antibacterial properties.
3. Shikakai: Gentle cleanser that promotes healthy hair growth.
4. Amla: Rich in vitamin C, it nourishes and strengthens hair.
5. Rosemary: Stimulates hair growth and improves circulation.
6. Tea tree oil: Antifungal and antibacterial properties help control dandruff and itchiness.

These plants can help:

1. Nourish and moisturize hair
2. Promote healthy scalp conditions
3. Support hair growth
4. Reduce dandruff and itchiness

Herbal shampoos can be a great option for those seeking natural, gentle hair care.

**DRUG PROFILE :**

## Table.1

| Sr. No. | Botanical Name | Common Name | Family | Part Used | Key Phytochemicals | Hair Benefits |
|---|---|---|---|---|---|---|
| 1 | *Sapindus mukorossi* | Reetha | Sapindaceae | Fruit pericarp | Saponins, sugars | Natural surfactant; provides cleansing and foaming; antifungal action |
| 2 | *Acacia concinna* | Shikakai | Fabaceae | Pods | Saponins, flavonoids, tannins | Strengthens hair roots, prevents dandruff, imparts shine |
| 3 | *Phyllanthus emblica* | Amla | Phyllanthaceae | Fruit | Vitamin C, tannins, flavonoids | Stimulates hair growth, reduces greying, nourishes scalp |

## MATERIALS AND METHODS

### MATERIAL USED:

- Ritha Extract
- Amla Extract
- Shikakai Extract
- Methyle Paraben
- Gelatine Solution
- Citric Acid
- Rose oil

**Table No 2**

| Ingredients and its Role: Sr. No. | Ingredient | Role of Ingredient |
|---|---|---|
| 1 | Ritha Extract | Foaming Agent |
| 2 | Amla Extract | To provide nourishment to hair |
| 3 | Shikakai Extract | Anti-Dandruff |
| 4 | Methyle Paraben | Preservative |
| 5 | Gelatine Solution | Base |
| 6 | Citric Acid | To adjust pH |
| 7 | Rose oil | Perfume |

**Table No 3 : Formulation of herbal shampoo**

| Sr. No. | Ingredient | Quentity given (for 100 gm.) | Quentity Taken (for 10 gm.) |
|---|---|---|---|
| 1 | Ritha Extract | 1% | 10 gm |
| 2 | Amla Extract | 1% | 10 gm |
| 3 | Shikakai Extract | 1% | 10 gm |
| 4 | Methyle Paraben | 1ml | 0.5% |
| 5 | Gelatine Solution | 5%(qs) | Qs |
| 6 | Citric Acid | 1% | Qs |
| 7 | Rose oil | 0.1ml | 0.01 ml |

**PROCEDURE:**

• **Ritha Extract:**

It is prepared by cold maceration method.

10 gm. of Ritha powder in 70% ethyl alcohol (30mL).

• **Amla Extract:**

10 gm. of Amla powder in 50ml water and boil

**Shikakai Extract:**

10 gm. of Shikakai powder boiled in 50 ml water.

• **Gelatin Solution:**

Boil 50 ml of water and add 1 gm. Gelatin powder and again boil for 5 min.Then mix all extracts and triturated together.

- **PREPARATION METHODS :**

**METHOD 1:**

The following steps are employed for the formulation of polyherbal shampoo powder

**Drying:** All the ingredients required for the shampoo preparation are dried and grinded.

• **Weighing:** All herbal powders required for the preparation are weighed separately.

• **Size reduction:** The weighed materials are subjected to size reduction using hand driven mixer individually.

• **Mixing:** The fine powders are mixed methodically using mixer to form a homogenous mixture.

• **Sieving:** The mixture is passed through sieve no 80, to get uniform size particles and reduce the lumps.

• **Packing and Labelling:** Finally, the powder was packed and labelled suitably.

**METHOD 2:**

The following steps are involved in the preparation polyherbal liquid shampoo:

• Collection of materials: Ingredients required for the preparation are collected and washed thoroughly and dried.

• Weighing: Ingredients are weighed individually and soaked overnight.

• Decoction preparation: Ingredients are boiled in the same water used for soaking on medium flame, allow to cool and filter

• Incorporate preservative (eg: Methyl paraben) to prevent microbial growth

**EVALUATION OF POLYHERBAL SHAMPOO POWDER :**

• **Organoleptic evaluation:**

• Organoleptic evaluation includes the assessment of parameters such as color, odor, texture taste etc.

**General powder Characteristics:**

• General powder characteristics includes the evaluation of parameters such bulk density, particle size and angle of repose.

i. **Particle size:** Particle size affects grittiness and spreading properties of powder.

Particle size is determined by using microscopy techniques.

ii. **Angle of repose**:

**Funnel method:**

Required quantity of powder is allowed to flow through a funnel which is placed at a height of 6 cm from horizontal base. The powder is allowed to flow to form a heap over the paper on the horizontal plane. The radius and the height of the powder heap is noted down.

iii. **Bulk density**:

Bulk Density is the ratio between the given mass of a powder and its bulk volume. Dried powder is filled into a 50 ml measuring cylinder upto 50 ml mark. Then the cylinder is tapped onto soft surface from a height of 1 inch at 2 second intervals. The volume of the powder is measured. The Bulk Density is calculated by using the belowgiven formula.

iv. **Tapped density:**

The tapped density is obtained after mechanically tapping container containing the powder. Dried powder is filled into 50 ml measuring cylinder upto 50 ml mark. Then the cylinder is tapped 100 times onto soft surface. The volume of powder is measured.

**Physicochemical evaluation:**

**i. pH:** The pH of the shampoo is measured by using pH meter.

**ii. Washability:** The ease and extent of washing can be checked manually by applying on skin.

**iii. Solubility:** Solubility is ability of the substance to dissolve in solvent. Solubility test is done by dissolving the sample in solvent followed by slight warming, cooling and filtering. Then the residue obtained is weighed and noted down.

**iv. Loss on drying:** Loss on drying is the loss of mass expressed in percent m/m.

About 2 g of powder is taken in a Petridish and placed in a desiccator for 2 days over

• **Dirt dispersion**: Dirt dispersion ability of the shampoo can be determined by using Indian ink. About 1% of shampoo solution taken in a test tube and 1 drop of India ink is added. The test tube is stoppered and shaken for about 10 mins. The amount of ink present in the foam is indicated as None, Light, Moderate, or Heavy.

• **Wetting time**: Canvas paper is used to determine the wetting time of shampoo. The canvas was cut into disc shape with 1 inch diameter with an average weight of 0.44 g. the disc was allowed to float on the surface of 1% shampoo solution

and the time taken by the disc to start sinking in the shampoo solution is noted as wetting time.

**Foaming index**: 1% w/v solution of the shampoo powder is prepared. Solution is warmed slightly for 30 mins, cooled, filtered and volume is made upto 100 ml. 1, 2,…10ml of extract is taken separately in 10 test tubes and volume is made upto 10ml using water. Shake the test tubes at a speed of 2 frequency per second for about 15 sec. then the test tubes are keptaside for 15 mins without shaking. Foam height(a) is measured.

• **Swelling index**: About 1g of shampoo powder is taken into a glass stopper cylinder containing 25ml of water. Then the measuring cylinder is shaken for 1 hour with an interval of 10 mins. The solution is kept aside for 3 hrs without shaking. Volume is measured in ml.

• **Nature of hair:** By gathering the responses from volunteers' nature of hair after washing can be evaluated.

**EVALUATION OF POLYHERBAL LIQUID SHAMPOO :**

• **Organoleptic evaluation/visual assessment:**

The prepared formulations are evaluated in terms of color, clarity, odor etc.

• **pH determination:**

The pH of the shampoo is measured by using pH meter.

• **Percentage of solid content determination:**

4g of shampoo is taken in a previously weighed evaporating dish and evaporated by placing the evaporating dish on the hot plate. The final weight is noted down. Percentage of solid contents of shampoo left after complete evaporation is calculated.

• **Rheological Evaluation:**

The viscosity of the shampoo is determined by using Brookfield viscometer.

• **Surface tension measurement:**

Stalagmometer is used for determining surface tension of shampoo using chromic acid and purified water. The data was calculated by equation given below:

**R3** = (**W3 -W1) n1×R1/(W2-W1) n2×R2**

Where,

W1 is the weight of empty beaker.

W2 is the weight of beaker with distilled water.

W3 is the weight of beaker with shampoo solution.

N1 is the no. of drops of distilled water.

N2 is the no. of drops of shampoo solution.

R1 is the surface tension of distilled water at room temperature.

R2 is the surface tension of shampoo solution.

• **Foaming ability and Foaming stability:**

The cylinder shake method is employed in the foaming ability and stability test. In this method 50ml of the 1% shampoo solution is taken in a 250ml graduated cylinder and covered the cylinder with hand. The cylinder is then shaken for 10 times. The volume of the foam appeared due to shaking is measured after every one minute consecutively for 5 minutes.

• **Wetting time test:**

Canvas paper is used to determine the wetting time of shampoo. The canvas was cut into disc shape with 1 inch diameter with an average weight of 0.44 g. the disc was allowed to float on the surface of 1% shampoo solution and the time taken by the disc to start sinking in the shampoo solution is noted as wetting time.

• **Dirt dispersion test**

About 1% of shampoo solution taken in a test tube and 1 drop of India ink is added. The test tube is stoppered and shaken for about 10 mins. The amount of ink present in the foam is indicated as None, Light, Moderate, or Heavy.

• **Cleaning action:**

About 1 g of grease is spread on non-adsorbent cotton and kept in conical flask containing 1% shampoo solution. The conical flask is shaken for 1 hr in

mechanical shaker. Cotton is collected, dried and weighed. The amount of grease removed is :

$$DP = 100 \left(1 - \frac{T}{C}\right)$$

Where,

C - Weight of grease in control sample

T - Weight of grease in test sample

DP-Percentage of detergency power

• **Skin sensitization test:**

Guinea pigs are used for skin sensitization test. They are divided into 7 groups (n=3). Hairs on the back of the guinea pigs are shaved previously. Shampoos are applied on the onto nude skin of animals. Formalin solution (0.8 %v/v) is applied as a standard irritant on animal. The application site is graded according to the erythema produced as: 0-none, 1-slight, 2-well defined, 3-moderate, 4-scar formation(severe).

**Conditioning performance evaluation**:

Artificial hair strands measuring roughly 10 cm in length are gathered from salons and split into two batches (control and test). One test hair sample is washed with a specially designed shampoo, while the control sample is left unwashed. The test sample needs to be dried and shampooed at least ten times. Shampoo's conditioning efficacy is evaluated using the blind touch test method. After being chosen, about twenty student volunteers are forced to handle the hair samples. A number of 1 -4 indicates how well the shampoo conditions hair (4-excellent, 3-good, 2-satisfactory, and 1-poor).

**Eye irritation test:**

Albino rabbits can be used for performing eye irritation test. The prepared shampoo solution is allowed to fall into eyes of six albino rabbits. The damage that is caused to rabbit’s eye at different time intervals is recorded. Eye Irritation can be caused due to ulceration,

**RESULT AND DISCUSSION :**

**Table No. 4** Test results of Herbal Shampoo

| S.no. | Parameters | Result |
|---|---|---|
| 1. | Colour | Dark Brownish |
| 2. | Odour | Aromatic |
| 3. | pH | Mild acidic (6.2) |
| 4. | Foam type | Small, Dense |
| 5. | Solid Content | 1.12 gram |
| 6. | Texture | Smooth |

The Formulated shampoo was clear and good appealing. It demonstrated good stability, detergency, cleansing, small bubble size, low surface strain and execute good conditioning property.

The herbal shampoos are the preparations which are used for the washing and cleaning of hairs and to provide nourishment. The herbal shampoos are widely used due to their no or less side effects as compared to conventional shampoos, because it contains pure natural or herbal ingredients rather than synthetic chemicals. Herbal shampoo does not require animal testing and it is skin friendly. Herbal shampoo was formulated by mixing different Ingredients in specific proportions. Selected plant materials are rich in polyphenol compounds such as alkaloid, flavonoid, tannins and saponin. They have found to exhibit Anti hairfall, Anti dandruff, cleansing, moisturising and surfactant properties. Physicochemical properties of the herbal shampoo were statistically evaluated. The effectiveness of herbal shampoo containing Ficus religiosa leaves, Hibiscus petals, Aloevera, Shikakai and Reetha can vary depending on several factors, including individual hair type and condition. While these ingredients are commonly used in ayurvedic and herbal hair care remedies, there is limited scientific research specifically on the combination of these ingredients in shampoo form.

**CONCLUSION:**

The applications and significance of herbal shampoo are the main topics of this review. Given that it is widely held that herbal products are risk-free and devoid of adverse effects, it also covers the awareness of and necessity for cosmetics containing herbal elements. It focuses on the kinds, preparation techniques, and assessment of polyherbal shampoos.

The purpose of this study was to create a shampoo that is entirely herbal and comparable to the synthetic shampoos that are sold now. We created a herbal shampoo by utilizing plant extracts, which are widely utilized in traditional Asian medicine and highly praised for their ability to cleanse hair. All of the components that go into making shampoo are safer than synthetic conditioning agents like silicones and polyquaterniums, and they also significantly lessen the loss of hair or protein when combing. To deliver the conditioning properties, we have used extracts from plants such as Sheekakai, Amla, Ziziphus, and others, rather than cationic conditioners.

To assess and contrast the physicochemical characteristics of shampoos that were prepared and commercialized, a number of tests were conducted. In quality control tests, our prepared shampoo performed similarly to commercially available shampoos, but more investigation and improvement are needed to raise the product's overall caliber.

Herbal shampoos for hair growth are made to strengthen the hair follicles by giving essential oils and nourishment all through the root and follicles. This, in turn, promotes hair growth and stimulates

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