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FORMULATION AND EVOLUTION OF HERBAL SHAMPOO

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➢ ABSTRACT:

Shampoos are cosmetic preparations designed to clean hair by removing oil and debris from the scalp and hair shaft. There is a large variety of synthetic shampoos with various uses on the market. However, the negative effects of these synthetic shampoos on the hair and scalp include keratin loss and dry hair. Because the chemicals in herbal shampoos are safe and have been used for a long time, they have become a popular substitute for synthetic shampoos. Similar to ordinary shampoo, herbal shampoo is a cosmetic preparation made with herbs that is intended to clean the hair and scalp. Many of the herbs used in herbal shampoos are said to have positive effects on hair. This study's goal is to create and assess a poly-herbal shampoo with herbal components for cosmetic use. The following powders and gels were purchased at the local market: hibiscus powder, neem powder, henna powder, amla powder, shikakai powder, ritha powder, and aloe vera powder. Homemade methods are used to make the soy milk and banyan root powder. These ingredients are then combined and their organoleptic and physico-chemical properties are assessed. In addition to cleaning hair, herbal shampoo also conditions and smoothes the hair's surface, promoting healthy hair that is free of dirt, grease, dandruff, and lice. Most importantly, its safety benefits are anticipated. Herbal cosmetics have the advantage of being non-toxic, reducing allergic reactions, and having many substances that have been shown to be effective throughout time. As a result, in the current work, we have discovered that herbal shampoo has good qualities and have further optimized its benefits for use as a cosmetic by humans.

Keywords: Cosmetic, Herbal shampoo

➢ 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 of these factors, the general population is becoming more interested in

herbal cosmetics because of their low cost and negligible adverse effects.

In our daily lives, shampoos are arguably the most used cosmetic products for cleaning our hair and scalps. In essence, a shampoo is a detergent solution with appropriate chemicals for additional benefits including lubrication, medicine, and improved hair conditioning. There are a lot of synthetic, 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 benefitson 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.

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

➢ 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.

MATERIALS AND METHODS

MATERIAL USED:

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

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

CONTENT AND ITS QUANTITY REQUIREMENT

Sr. No.	Ingredient	Quantity Given (for 100 gm.)	Quantity 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	1 mL	0.5 %
5	Gelatine Solution	5 % (qs)	Qs
6	Citric Acid	1%	Qs
7	Rose oil	0.1 mL	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.

➢ **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.

➢ TYPES OF SHAMPOOS :

Shampoos are of following types

- Powder shampoo
- Clear liquid shampoo
- Lotion shampoo
- Solid gel shampoo

- Medicated shampoo
- Liquid herbal shampoo

➢ **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:

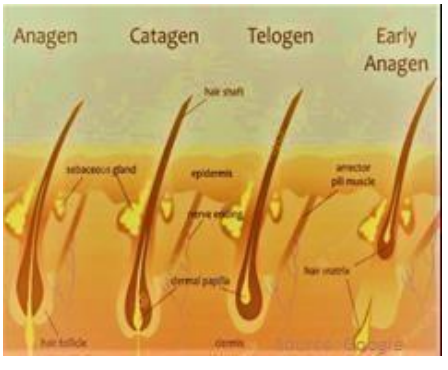
- Medulla: It is the innermost layer of the hair shaft, made up of an amorphous, soft, oily substances.
- Cuticle: Thin protective outer layer that contains nutrients beneficial for hair growth. It is highly keratinized with cells shaped like scales
- Cortex: It is the main constituent of the hair, containing 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.

Hair structure 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.

HERBS 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 hairgrowth, 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 prostrat a	Bhringraj	Hair tonic	
Withania somnifer a	Ashwagan dha	Controls hair fall, promotes hair growth, improves circulation of thescalp.	
Camelli a sinensis	Green tealeaves	Hair growth and enrichment	
Bacopa monner i	Brahmi	Supports the hairgrowth	

➢ **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 areweighed 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, thepowder 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.

$$\text{Bulk density} = \frac{\text{Mass of the herbal shampoo}}{\text{Volume of the herbal shampoo}}$$

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.

$$\text{Tapped density} = \frac{\text{Weight of powder}}{\text{Tapped volume of powder}}$$

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 kept

aside for 15 mins without shaking. Foam height(a) is measured.

$$\text{Foaming index} = \frac{1000}{a}$$

- **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:

$$R_3 = (W_3 - W_1)\, n_1 \times R_1 / (W_2 - W_1)\, n_2 \times R_2$$

Where,

W_1 is the weight of empty beaker.

W_2 is the weight of beaker with distilled water. W_3 is the weight of beaker with shampoo solution. N_1 is the no. of drops of distilled water.

N_2 is the no. of drops of shampoo solution.

R_1 is the surface tension of distilled water at room temperature. R_2 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 :

$$DP = 100\ (1 - {}^{T}_{C})$$

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,

ADVANTAGES

- 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.

DISADVANTAGES

- It fades the texture and shine.
- It can make your hair dry and frizzy.
- It dries out the scalp.
- You may also experience dandruff.
- You can experience breakage.
- It causes more split ends.

RESULT

Herbal Shampoo was prepared and evaluated

Sr. No.	Parameter	Observations
1	Color	Brownish
2	Odour	Pleasant
3	Appearance	Turbid
4	Texture	Gritty
5	Foaming Index	500
6	Dirt Dispersion test	Light
7	% solid content	8.25%

➢ 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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