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Formulation of Wonderful Base Pomegranate Shampoo and Evaluation of It

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Abstract

The current study objective was to create and assess a herbal shampoo using natural ingredients that prioritized both efficacy and safty. The extracts of pomegranate (the active ingredient), curry leaves, hibiscus leaves, Fenugreek seeds and reetha were combined in varying amounts to make the shampoo. As ancient times, people are used herbal shampoos, which are cosmetic preparations made with traditional ayurvedic herbs, to clean their hair, scalp, and to beautify and manage their hair. Herbal shampoos are utilized for more than just cleaning; they also add shine, keep hair manageable, and reduce oiliness. Visual evaluation, wetting time, pH, solid content assurance, surface tension, detergency, dirt dispersion, conditioning effectiveness, and foam stability were all assessed using a variety of physicochemical procedures. The herbal shampoo has been created to exhibit excellent cleaning, detergency, foam stability, low surface tension, optimal pH, and conditioning activities. Herbal shampoo has a light dirt dispersion and a foam height. The shampoo formulations were not only far less harmful than the chemical conditioning agents, but they also strengthened the hair development and significantly decreased the amount of hair lost when brushing. To preserve the scalp's acidic layer, the shampoos' pH was adjusted. It was discovered to be safer, more efficient, and cost-effective.

Keywords: Cream shampoo, efficacy, pomegranate, stability, pH

INTRODUCTION

The most crucial element of human beauty are hairs. Therefore you usually take the care of hair by using various cosmetic products which are herbal or chemical hair care products from them the Shampoos are certainly the most popular cosmetic item used on a regular basis to clean your hair and scalp. As basically, a shampoo is a detergent solution with appropriate additions for additional uses like lubrication, medication, hair conditioning, etc. [1]. The purpose of shampoo is to nourish the hair, eliminate built-up debris, and restore its healthy appearance without excessively removing sebum [2]. As shampoos are one of the cosmetics product that are used on a regular basis, the shampoo industry is most likely the one with the most market share for hair care products [3]. There are a lot of synthetic shampoos available currently, both medicated and non-medicated; nevertheless, herbal shampoos have become more and more popular in recent years because of their natural origins, safety, rising customer demand, affordabally [4–5]. As ancient times, people are used herbal shampoos, which are cosmetic preparations made with traditional ayurvedic

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herbs, to clean their hair, scalp, and to beautify and manage their hair [6]. Herbal shampoos are utilized for more than just cleaning; they also add shine, keep hair manageable, and reduce oiliness [7]. It is therefore believed that the herbal formulations are a decent alternative to synthetic shampoo; nonetheless, it is challenging to make cosmetics using only natural materials [8, 9]. Making a herbal shampoo with just one natural ingredient that is as light and safe as synthetic ones while still competing well in terms of foaming, detergency, and solid content is really challenging [10]. When selecting active ingredients for hair care products, emphasis is given to an ingredient's ability to prevent skin damage as well as improve skin quality by cleansing, nourishing, and shielding the skin. In order to provide excellent hair care, we thus tried to create a fundamental protocol for the manufacture of herbal shampoo [11–13].

IDEAL CHARACTERISTICS [13-14]

1. Should efficiently and totally eliminate all debris and superfluous accumulation between hair and sebum.
2. Need to produce a significant amount of foam
3. Needs to get softer and more manageable in appearance.
4. Should be simple to remove with a water rinse.
5. Should give the hair a pleasing scent.
6. The hand shouldn't get rough or chapped.
7. Shouldn't result in any negative repercussions.
8. Must not irritate the eyes or skin.
9. Need to offer efficacy and safety.
10. Should enhance the way the scalp and hair feel and appear.

CLASSIFICATION OF SHAMPO [15, 16]

Based on Appearance

Powder shampoo
Liquid shampoo
Lotion shampoo
Cream shampoo
Jelly shampoo
Aerosol shampoo
Solid gel shampoo

Based on Use or Function

Conditioning shampoo
Antidandruff shampoo
Baby shampoo
Therapeutic shampoo
Balancing shampoo
Clarifying shampoo

Powder Shampoo

It is a powder. This particular kind of shampoo lessens oiliness in hair without requiring water. When water or another solvent is added to a component, especially a medicated shampoo, the component's activity is reduced and powder shampoo is created.

e.g: Neem powder shampoo

Liquid Shampoo

It is a hair care product that is most frequently used to clean hair. It usually takes the shape of a

different liquid. In this preparation, alkanolamides are an additional option. There could be some transparency to this shampoo.

e.g: Loreal liquid shampoo, TRESemme liquid shampoo.

Lotion Shampoo

Anionic surfactant calm lotion shampoo is used to the hair or scalp to manage it.In order to liquefy the additional opacifier, solubilizing agents such as magnesium stearate are also utilized in the modification of apparent liquid shampoo.

e.g.: Redken cream shampoo

Cream Shampoo

These shampoos come in a collapsible tube and have a paste-like consistency. They are quite helpful in hair salons. They can also be found in wide-mouth jars. Together with cetyl alcohol, which acts as a builder, alkyl sulfates are added to create the paste's consistency.

e.g: Redken cream shampoo

Jelly Shampoo

It is a protein-rich material made by honey bees that is suitable for use in hair salons and beauty parlors as shampoo.

e.g: Garnier shampoo, honey and royal jelly shampoo

Aerosol Shampoo

Aerosol shampoos are typically used on oily hair because they comprise small liquid or solid particles trapped in a gas. Reduce the shampooing components' action. The bottle opening has a regulator attached to it. Pressing the valve causes foam to emerge, which is shampoo.

Shampoo with Solid Gel

These are often made with a gelling substance (cellulose, for example), which makes them thick and transparent. It is very helpful in beauty and hair establishments. Detergent, the primary ingredient, can be used either on its own or in combination with soap. It is possible to create gel with the right consistency by adjusting the detergent dosage. Clear liquid shampoo is thickened with methyl cellulose to generate gel shampoo.

Conditioning Shampoo

These shampoos are used to condition hair. They start by cleaning the hair and scalp and maintaining their glossy, silky state. They also stop hairs from adhering. Nowadays, a lot of men and women use conditioner shampoo. Quaternary ammonium compounds are used to make the majority of conditioners. These substances have the ability to lessen the electrostatic charges that exist between hair strands, making hair more manageable and shiny. These substances may also have bactericidal properties.

Anti-dandruff Shampoo

Dandruff can be relieved with the use of an anti-dandruff shampoo. It has abrasives and washing chemicals that eliminate buildup from the hair and scalp, much like a typical shampoo does.

Baby Shampoo

As pediatric shampoo, often known as baby shampoo, is a hair cleansing solution designed especially for newborns and early children (typically under three years old). In order to minimize discomfort and shield babies from stinging or burning if baby shampoo gets in their eyes by accident, it is made with a light and gentle recipe.

FUNCTION OF SHAMPOO [17]

1. The dirt or soil should be removed thoroughly and effectively
2. The hair should be thoroughly cleaned.

3. To please the user, a sufficient amount of foam should be produced.
4. Rinsing with water should be an easy way to get rid of it.
5. It ought to give the hair a pleasing scent
6. It shouldn't irritate the skin or eyes or have any negative side effects.

HAIR PROBLEMS [19]

Dandruff

Dandruff is the scaly particles that stick to the hair root and can be brought on by an overabundance of sebum, an infection, a dry scalp, and sensitivity to specific products. Since apple cider vinegar has anti-inflammatory and antibacterial qualities, it is a natural quick remedy for dandruff. Dandruff relief can also be greatly aided by the use of omega-3 fatty acids, coconut oil, and tea tree oil.

Hair loss

It is possible to prevent by eating a diet high in protein, changing to mild shampoos, massaging with heated oil, drinking plenty of water, and getting frequent exercise shown in Figure 1.

Dry Hair

Dry hair is caused by a protein deficit; however, hormonal imbalances, anemia, hyperthyroidism, menopause, and pregnancy are among other underlying conditions that can also cause dry hair. Foods high in omega 3 and 6 fatty acids can restore the luster of your hair.

Oily scalp

The most common cause of an oily scalp is overwashing, among the numerous other factors that include genetics, bad diet, and hormone fluctuations. Lactic acid is one ingredient that helps control the amount of oil produced.

Hair colour damage

Over time, frequent hair coloring can cause damage to the hair. Additionally, split ends, breakage, dandruff, and dryness may be brought on by the dye's ingredients. Shampoos with medication. Extra attention, nourishment, and conditioning can help the hair.

Split ends

Heat can also exacerbate the issue. Applying a small amount hair oil to the ends can prevent broken ends.

Dull hair / Heat damaged hair

To achieve completely straight hair, it's tempting to use a straightener with a high temperature (450 degrees Celsius). The temperature can burn the hair and cuticles, causing damage. This are some common hair problem in now a days for treating this hair problem the herbs are very effective therefore in this formulation add some herbs. The herbs which are added into the formulation as follows:

Figure 1. Hair Problem.

1. Pomegranate Peel
2. Reetha
3. Curry leaves
4. Hibiscus
5. Fenugreek
6. Butterfly pea Flower

DRUG PROFILE

Pomegranate

Common Name: Annar, Dalim

Biological Sources: Fruit of Plant *Punica granatum*

Family: Lythraceae

Chemical Constituents: Gallo tannins, ellagic acid, punicalins, punicalagins, and gallic acid

Uses: Pomegranate (shown in Figure 2) peel powder contains polyphenols that reduce hair loss, prevent dandruff, and darken hair color. It improves blood flow to the scalp, fortifies hair follicles, and encourages the growth of healthy hair. Strengthen Dull Strands & Gives Hair a Natural Gloss.

Figure 2. Pomegranate.

Reetha

Common Name: Indian soapberry, washnut, ritha

Biological Sources: Dried fruit of plants *Sapindus mukorossi*

Family: Sapindaceae

Chemical Constituents: Reetha (shown in Figure 3) mainly contain saponins (10%-11.5) Sugar (10%) & mucilage Triterpenes Six sapindoside (sapindoside A, B, C, D & mukorossi saponins (E1&Y1)

Uses: Used to shine hair, Use for curing hair issue, Natural cleanser, Detergent foaming property [20].

Figure 3. Reetha (Soap nut).

Curry tree

Common Name: karivepaku, karibevu, karivepallai, karivembu, or kadipatta

Biological Sources: dried leaves of plants *Murraya koenigii*

Family: Rutaceae

Chemical Constituents: Linalool (32.83%), elemol (7.44%), geranyl acetate (6.18%), myrcene (6.12%), allo-ocimene (5.02), α-terpinene (4.9%), and €-β-ocimene (3.68%)

Uses: The scalp restoration method strengthens and repairs damaged hair. These products contain amino acids and antioxidants, which strengthen hair follicles and hydrate the scalp. It also removes dead hair follicles, possibly contributing to its anti-dandruff properties.

Hibiscus

Common Name: China rose,rose mallow

Biological Sources: Dried leaves of *Rosa sinensis*

Family: Malvaceae

Chemical Constituents: -sitosterol, stigmasterol, taraxeryl acetate, and three cyclopropane compounds and their derivatives, cyanidin glucoside, flavonoids, vitamins, thiamine, riboflavin, niacin, ascorbic acid, quercetin-3-diglucoside, 3,7-diglucoside, cyanidin-3,5-diglucoside, 6-cyanidin-3-sophoroside-5-

Uses: It is applied to promote hair growth and lessen gray hair. Mucilage and plant proteins found in the flowers and leaves have anti-dandruff and anti-hair loss properties. Hibiscus (shown in Figure 4) infusions are effective as a final rinse, adding warm red hues, providing good slide, and detangling naturally curly hair. Helps in nourishing hair [21].

Figure 4. Hibiscus.

Fenugreek

Common Name: methi

Biological Sources: Dried fruit of plant *Trigonella foenum-graecum*

Family: Fabaceae

Chemical Constituents: Quercetin-3-O-rhamnoside (quercitrin), vitexin-7-Oglucoside (afroside), and apigenin-6-C-glucoside (isovitexin).

Uses: It is a common spice in all Indian kitchens. Fenugreek seeds (shown in Figure 5) contain nicotinic acid, a protein proven to effectively reduce hair loss, stimulate hair growth, address dandruff, reduce Scalp inflammation, and reviving damaged hair [22].

Figure 5. Fenugreek.

Butterfly Pea Plant

Common Name: Gokarna flower plant, Asian pigeonwings, blue pea
Biological Sources: flower of plant *Clitoria ternatea*

Family: Fabaceae

Chemical Constituents: tannins, phlobatannin, carbohydrates, saponins, triterpenoids, phenols, flavanoids, flavonol glycosides, proteins, alkaloids, anthraquinonoids, anthocyanins, cardiac glycosides, Stigmast-4-ene-3,6-dione, volatile oils and steroids

Uses: Blue pea blossom known as butterfly pea plant (shown in Figure 6) is also good for your hair since it contains anthocyanin, a substance that increases blood circulation in the head and thus helps to keep your scalp healthy. It also strengthens hair follicles from within.

Figure 6. Butterfly pea plant.

FUNCTION OF OTHER CHEMICALS

1. *Steric acid:* Eliminate extra oil, sweat, and debris from the skin and hair.
2. *Cetyl Alcohol:* Moisturizing and nourishing hair.
3. *Emulsifying wax:* Use oils to make up for the product's tendency to dry out the skin.
4. *Sodium lauryl sulphate (SLS):* It has a surfactant function.
5. *EGMS (ethylene glycol mono stearate):* pearlescing ingredient for shampoos that provides a strong, stable sheen.
6. *Coca Butter:* nourishes the hair, while soothing and supporting scalp health.
7. *Methyl paraben:* Preservatives .
8. *Rose water:* Reduce oiliness and dandruff.
9. *Vitamin E:* improves hair texture, resulting in a more glossy look.
10. *Glycerine:* It helps in moisturizing of hair.

CREAM SHAMPOO

Cream shampoo is a grounding agent used to clean hair and scalp. Cream shampoo is a thicker and pearlescent version of liquid shampoo that aims to deliver more intensive conditions. The substance was moist, but not fully dissolved. Compared to solids, they would apply and dissolve more quickly. Typically, they are presented in tubes or jars [23].

METHOD OF PREPARATION

Collection of herbal material:

The parts of plants like Pomegranate (peel), Reetha (fruit), Hibiscus (leaves), Curry patta (leaves), Butterfly pea plant (leaves) and Fenugreek (seed) this all plant part have collected then they were washed under running water to remove contaminants. After being sun-dried to a coarse powder, they are sieved through 60 meshes [24].

Preparation of Herbal Extracts

Weigh the herbal material as 20 g of Curry leaves powder, 20 g of Pomegranate peel powder, 20 g of hibiscus leaves powder, 20 g Fenugreek seeds powder, 5g of butterfly pea flower powder and 30 g of Reetha shown in table 1 were all mixed with 100 ml water in a stainless steel vessel. The mixture was allowed to boil until the water content dropped to 25%. After then, it was filtered. After using the decoction procedure to prepare the extracts, the clear extract was utilized as a herbal extract [25].

Preparation of Shampoo

Oil Phase

1. First take beaker and add the 1 g steric acid, 15 g cetyl alcohol, 15 ml glycerine and 20 g of emulsifying wax are shown in Table 2.

Water Phase

2. Take another beaker and add 200 ml of SLS (sodium lauryl sulfate) and 12 g of EGMS (ethylene glycol mono stearate) then Add 3.5 gm Coco butter and 150 ml (q.s.) Rose water put both the beaker on the water bath .
3. The aqueous phase is added dropwise to the plant extract and continuously stirred, and the oil phase is added dropwise to this solution and continuously stirred and continuously heated.
4. Vitamin E and some methyl preparation is added to this. Paraben is added to the aforementioned solution as a preservative.
5. To increase the viscosity of the solution, this solution was kept under a mechanical stirrer for about 20 minute
6. Transfer the preparation to a well-closed container.

Table 1. Ingredients of herbal extract

Plants	Part used in formulation	Quantity
Pomegranate	Peel	20 gm
Curry tree	Leaves	20 gm
Hibiscus	Leaves	20 gm
Fenugreek	Seeds	20 gm
Butterfly pea plant	Flower	5 gm
Reetha	Fruit	30 gm

Table 2. Composition of herbal shampoo.

S.N.	Name of ingredients	Quantity
1	Herbal Extract	50 ml
2	Stearic Acid	1 gm
3	Cetyl Alcohol	15 gm
4	Emulsifying wax	20 gm
5	SLS	5 gm
6	EGMS	12 gm
7	Coco butter	3 gm
8	Methyl Paraben	1 gm
9	Vitamin E	1
10	Glycerine	5 ml
11	Rose water	150 ml

EVALUATION PARAMETERS

pH Measurement

A 10% v/v shampoo solution produced with distilled water was measured for pH using a calibrated pH paper shown in Figure 7 [18].

Figure 7. Calibrated pH paper

Diffusion of Dirt

Two drops of herbal shampoo were added to 10 ml of distilled water in a wide-mouth beaker. The Falcon Tube was shook ten times under the cover after one drop of India ink was added. None, Light, Medium or Heavy were the estimated amounts of ink in the foam covered by it. None, Light, Medium or Heavy were rated amounts of ink in the foam shown in Figure 8.

Figure 8. Dirt Dispersion.

Foam Capacity and foam Resistance

The foaming capacity was determined using the cylinder shaking method. A 250 ml bottle was filled with 50ml of the 1% herbal shampoo solution. Graduated cylinder, which was shook for ten minutes while being covered with hands. We shook the mixture for one minute before measuring the total amount of foam content. Following the shaking, the volume of foam was measured and recorded every minute for 10 minutes [20]. The shampoo's stability is good because, for about five minutes, the amount of foam it produces stays constant. Additionally, the prepared shampoo has a higher foam property, which might be attributed to the soapnut's presence shown in Figure 9.

Figure 9. Foam capacity and foam resistance.

Cleaning Actions

The cleansing properties of the herbal shampoo were evaluated by applying the shampoo to unwashed hair for seven days. The hair of a person who applied oil 4–5 hours before washing is washed with shampoo. The effectiveness of the shampoo was evaluated according to its ability to

remove greasy dirt from the scalp.

Actual appearance/Visual assessment

The planned home grown cleanser as displayed is dark shinning in variety. It has a decent scent given by the scent in the fixings and furthermore a decent froth delivering capacity shown in Figure 10.

Figure 10. Actual appearance.

Stability Study

The stability of the preparations during storage indicates that they are chemically and physically stable. The formulated cream shampoo is chemically and physically stable at normal room temperature of 25–30°C. After a 4-week stability assessment, the results indicate that it has good stability.

Spreadability

Spreadability is the duration in seconds that two slides need to separate from the shampoo layer that separates them when a specific voltage is applied to them shown in Figure 11. If it takes less time to separate the two slides, spreadability is improved.

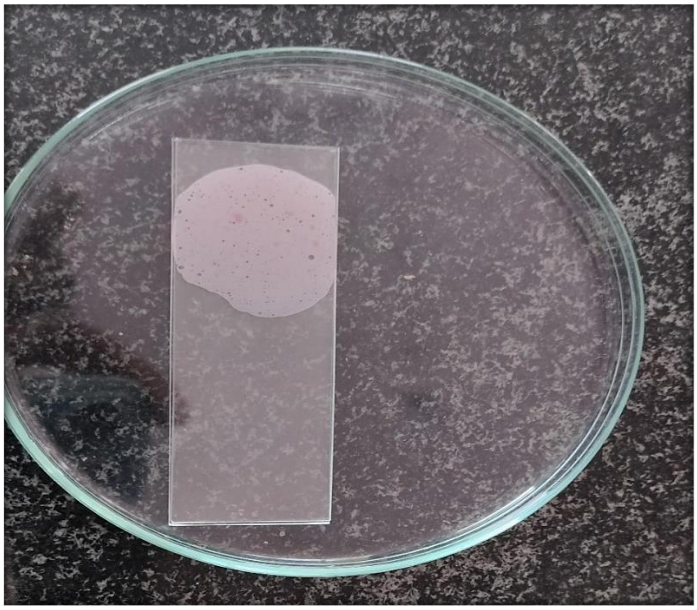

Figure 11. Spreadability.

Spreadability = M×L÷T

M= Weight of slide.

L= Length of Slide.

T= Time required for separate two slide.

RESULT

The product evaluation revealed positive outcomes across various parameters shown in Table 3. With acceptable pH levels, moderate dirt dispersion, and stable foaming ability, it promises effective cleansing without causing skin irritation. Its pleasing pink appearance, coupled with good stability and easy spreadability, makes it a promising addition to skincare routines.

Table 3. Result of evaluation parameters.

Parameters	Observation
pH measurement:	
Dirt dispersion:	Light
Foaming ability and foam stability	13ml for 1 ml after 10 min 10 ml
Skin Irritation Test	Nil
Cleaning Action	Good
Actual appearance/Visual assessment	Pink
Stability study	Good stability
Spreadability	24

CONCLUSION

After formulating and evaluating the pomegranate-based cream shampoo, we can conclude that it is a promising product. The pomegranate extract adds nourishment and antioxidants to the shampoo, promoting healthy hair and scalp. The cream formulation provides a luxurious and moisturizing experience. Overall, the pomegranate base cream shampoo shows great potential for delivering the benefits of pomegranate to hair care routines. The goal of the cream shampoo preparation, which was created using traditional knowledge, was to create a stable and functionally effective product. The shampoo formulations Were not only far less harmful than the chemical conditioning agents, but they also strengthened the hair development and significantly decreased the amount of hair lost when

brushing. To preserve the scalp's acidic layer, the shampoos' pH was adjusted. It was discovered to be safer, more efficient, and cost-effective.

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