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Formulation and Evaluation of Herbal Anti-Dandruff Shampoo.

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ABSTRACT:

The Herbal Guava Leaf Shampoo project focuses on developing a natural, eco-friendly, and sustainable hair care product utilizing the medicinal properties of guava leaves (*Psidium guajava*). Guava leaves are rich in bioactive compounds, such as flavonoids, tannins, and essential oils, which are known for their antimicrobial, anti-inflammatory, and antioxidant properties. These properties make guava leaves an ideal ingredient for promoting scalp health, reducing dandruff, and strengthening hair follicles. This project aims to formulate a shampoo that is free from harmful synthetic chemicals, such as sulfates and parabens, and instead incorporates guava leaf extract as the primary active ingredient. The formulation process involves the extraction of guava leaf compounds using eco-friendly methods, followed by blending with other natural ingredients like aloe vera, Amla powder, Neem powder, Reetha powder, Bhirnhray powder, and essential oils to enhance moisturizing and nourishing effects.

The final product is designed to cater to the growing demand for organic and herbal personal care products, offering a safe and effective alternative for consumers with sensitive scalps or those seeking to avoid synthetic additives. The project also emphasizes sustainability by utilizing renewable resources and minimizing environmental impact throughout the production process.

In conclusion, the Herbal Guava Leaf Shampoo project not only highlights the potential of natural ingredients in hair care but also aligns with global trends toward sustainable and health-conscious consumer products. This innovative shampoo promises to deliver a holistic hair care solution while promoting environmental responsibility.

Keywords: Guava Leaf Shampoo, Herbal Shampoo Formulation, Natural Shampoo, Base Plant-Based Surfactants, Botanical Hair Care, Guava Leaf Extract, Aloe Vera Shampoo, Essential Oils, Amla Hair Strengthening, Neem Scalp Care, Shikakai Cleansing, Vitamin E Shampoo, Glycerin Hydration, Cold Process Shampoo, pH-Balanced Formula.

Introduction:

Dandruff is a common scalp condition characterized by the shedding of dead skin cells from the scalp, often accompanied by itching and irritation. It can affect individuals of all ages and is usually caused by factors like fungal infections (particularly *Malassezia* species), dry skin, oily scalp, and sensitivity to hair products. Over-the-counter shampoos containing synthetic chemicals may not always be effective and can sometimes cause side effects like dryness or scalp irritation.

Herbal shampoos have gained popularity due to their natural ingredients and minimal side effects. Among the various plant-based remedies, guava leaves (*Psidium guajava*) have shown potential benefits for treating dandruff. Guava leaves are rich in bioactive compounds like flavonoids, tannins, and saponins, which possess antimicrobial, anti-inflammatory, and antioxidant properties. These compounds are believed to combat dandruff by reducing the growth of dandruff-causing fungi, soothing irritation, and promoting a healthier scalp environment.

The formulation of a herbal anti-dandruff shampoo using guava leaves can offer a natural alternative to synthetic products, with the added benefit of fewer adverse effects. This shampoo is expected to provide antimicrobial, soothing, and nourishing effects for the scalp, thereby reducing dandruff and promoting overall scalp health. [1]

Advantages of Shampoo:

1. Cleansing properties, improving hair hygiene
2. Treating scalp conditions,

3. Treatment for dry scalp.
4. Treatment for hair loss.
5. Relieves itch and irritation.
6. Repairs damaged hair and keeps hair silky or smooth.
7. It keeps your hair beautiful and blossoming. [3]

Ideal Properties of Shampoo:

1. Antimicrobial Activity:

The guava leaf extract should have strong antimicrobial properties to combat the fungi (*Malassezia*) and bacteria that contribute to dandruff. This helps reduce scalp infections, flaking, and itching.

2. Anti-Inflammatory:

The shampoo should contain compounds that soothe irritation and reduce inflammation on the scalp. This helps to relieve the redness, itching, and discomfort commonly associated with dandruff.

3. Antioxidant-Rich:

The shampoo should be rich in antioxidants, such as vitamin C and flavonoids, which help protect the scalp from oxidative stress caused by environmental pollutants and free radicals. This can also aid in maintaining overall scalp health and reducing premature aging of skin cells.

4. Hydrating:

An ideal herbal guava leaf shampoo should have hydrating properties, ensuring the scalp and hair retain moisture without causing dryness or flakiness. Ingredients like glycerin or aloe vera can help in maintaining scalp moisture balance[4]

Functions of Herbal Shampoo:

1. Anti-Dandruff Action:

- Guava leaves are rich in antimicrobial compounds, including flavonoids and tannins, which help reduce the growth of dandruff-causing fungi such as *Malassezia*. This reduces the flaking and itching associated with dandruff.

2. Anti-Inflammatory:

- The natural compounds in guava leaves have anti-inflammatory properties that help soothe an irritated scalp. This reduces redness, swelling, and itching, which are common symptoms of dandruff.

3. Antioxidant Protection:

- Guava leaves are high in antioxidants, which help protect the scalp from oxidative stress caused by environmental factors, such as pollution and UV radiation. This helps maintain scalp health and prevent premature aging of the skin cells on the scalp.

4. Strengthening Hair:

- Guava leaf extract is rich in vitamins and minerals like vitamin C, which are beneficial for strengthening hair follicles and promoting overall hair health. This helps in reducing hair breakage and thinning.[5]

Objective:

1. To Control and Prevent Dandruff:

The shampoo aims to reduce dandruff by targeting the root causes, such as *Malassezia* fungi and scalp inflammation, using the antimicrobial and anti-inflammatory properties of guava leaves.

2. To Soothe and Relieve Scalp Irritation:

One of the key objectives is to calm itching, redness, and discomfort caused by dandruff or scalp sensitivity through the anti-inflammatory and soothing properties of guava leaf extract.

3. To Improve Scalp Health:

The shampoo is designed to maintain a healthy scalp by balancing the scalp's pH, hydrating the scalp, and providing essential nutrients, ensuring a clean, nourished, and balanced environment for hair growth.

4. **To Nourish and Strengthen Hair:**

The formulation aims to strengthen hair follicles, reduce hair breakage, and promote healthier hair growth by providing essential vitamins and antioxidants found in guava leaves, such as vitamin C.

5. **To Provide a Natural and Gentle Alternative:**

The objective is to offer a chemical-free alternative to synthetic dandruff treatments, focusing on natural ingredients that are safe for regular use without causing irritation or dryness.

6. **To Maintain Moisture and Hydration:**

The shampoo should help prevent dryness by locking in moisture, ensuring that the scalp and hair remain hydrated, preventing flakiness and keeping the hair soft and shiny[6]

Plan Of Work :

This thesis will be structured as per the plan of the work given below:

1. Identification of the problem.
2. Selection of plant material.
3. Identification and collection of plant material.
4. Extraction of plant material.
5. Formulation of herbal shampoo.
6. Evaluation of herbal shampoo.[10]

Drug Profile:

1.Guava Leaf:



Common Name : Goiabeira, Guava, Guayabo, Guyava, Kuawa, Red guava

Scientific Name : Psidium guajava

Family: Myrtaceae (myrtle)

Geographical source: Guava is a tropical fruit produced by the guava tree. Large quantities of the guava fruit are produced in Brazil, Colombia, Venezuela, and Mexico.

Uses:

People use guava for colic, diarrhoea, diabetes, cough, cataracts, high cholesterol, heart disease, and cancer. It is a source of Vitamin D, fibre, and other substances that act like antioxidants. Antioxidants slow down or stop the harmful effects of oxidation. Guava leaves also contain chemicals with antioxidant and other effects. It is not known how guava works for medical conditions.

2.Amla:



Synonyms: Emblica, Indian gooseberry, amla.

Biological Source: This consists of dried as well as fresh fruits of the plant *Emblica officinalis* Gaerth

Family: Euphorbiaceae.

Uses:

- **Promotes Healthy Hair Growth:**

Amla is rich in vitamin C, antioxidants, and other essential nutrients, which help strengthen hair follicles and stimulate healthy hair growth. When combined with guava leaf extract, which also supports hair health, it can lead to fuller, thicker hair by nourishing the scalp.

- **Strengthens Hair:**

Amla is known to prevent hair breakage and thinning due to its high concentration of nutrients like iron and calcium. These nutrients nourish the hair strands, making them stronger and less prone to damage. This makes the shampoo more effective at preventing hair fall, especially when combined with the scalp-soothing properties of guava leaves.

- **Reduces Dandruff and Flakiness:**

Amla has natural anti-inflammatory properties that help soothe and calm the scalp, reducing itching and irritation. When combined with the antimicrobial properties of guava leaves, it helps combat dandruff by reducing inflammation and controlling the growth of dandruff-causing fungi.

3.Neem:



Synonym: Margosa, Indian Lilac and Azadirachta Indica.

Scientific name: Azadirachta indica

Family: Meliaceae

Chemical constituents: quercetin, nimbosterol, nimbin

Uses:

1. Neem has properties is an effective herb to treat hair loss.
2. It has antifungal properties that may help within the treatment of dandruff.
3. The regenerative properties of neem help in reducing hair fall.
4. It helps the hair follicles to become stronger and also encourages hair growth.
5. Its medicinal properties are an effective herb to treat hair loss.
6. The extracts of the leaves are widely used in skincare and hair care products

4.Reetha:



Botanical name: Sapindus mukorossi

Common name: Soapnut

Plant part used: Fruit

Family: Sapindaceae

Benefits: Provides shining and silky hair, Detergent Bhringraj

Uses :**1. Gentle on the Hair:**

Unlike synthetic shampoos, Reetha is mild and does not cause dryness or irritation, making it suitable for sensitive skin and all hair types.

2. Promotes Healthy Scalp:

Its natural antimicrobial properties help to maintain a clean, healthy scalp, preventing dandruff and other scalp infections.

3. Improves Hair Texture:

Reetha conditions the hair, making it softer, shinier, and more manageable.

4. Strengthens Hair:

It helps to strengthen the hair roots and reduce hair fall, promoting stronger and thicker hair growth.

5. Bhringraj:

Botanical Name: *Eclipta alba* (Linn.) Hassk.

Family: Asteraceae

Chemical constituents:

1. Leaves: Wedelolactone [1.6%], stigmasterol, desmethylwedelolactone-7 glucoside.
2. Roots : Hentriacontanol, heptacosanol and stigmasterol , ecliptal.
3. Aerial parts: β -amyrin and luteolin-7-O-glucoside, apigenin

Uses:**1. Promotes Hair Growth:**

Stimulates hair follicles and encourages new hair growth.

2. Prevents Hair Fall:

Strengthens hair roots, reducing hair fall and breakage.

3. Improves Scalp Health:

Antimicrobial and anti-inflammatory properties help treat scalp issues like dandruff, irritation, and infections.

4. Balances Sebum Production:

Regulates oil production on the scalp, preventing dryness or excessive oiliness.

5. Prevents Premature Graying:

Stimulates melanin production, helping maintain natural hair color and prevent graying.

Excipient Profile:**1.Tragacanth:**

It is the dried gummy exudation obtained by incision from the stem and branches of *Astragalus gummifer* L. *Astragalus membranaceus*, and other species of *Astragalus*. [7]

Family: Leguminosae

Tragacanth gum is a fixative, emulsifier, film former, and suspending and thickening agent. Among them were facial and eye makeup, hair colouring and no colouring products, oral hygiene items, shaving supplies, and skin care products.

2.SLS (sodium lauryl sulphate):

The purpose of this sulphate is to remove oil and dirt from your hair. It is useful for those suffering from dry or damaged hair; retaining natural moisture will help with overall hair health. [8]

3.Lavender Oil:

Lavender essential oil, a colourless or yellowish, clear liquid obtained from the aerial part of the plant, has a very fresh, lightly camphorous, herbal aroma. The chemical composition of the oil was precisely explored, giving as a result over 300 components, including those with high biological activity. In the chemical aspect, essential oils are multi-ingredient mixtures of terpen compounds—phenyl propane derivatives as well as compounds containing sulphuric, nitric substances, acetylene derivatives and others. Compounds found in essential oils have hydrocarbon, alcohol, aldehyde, ketone, ester and ether characteristics.[9]

Material and Method:

Material:

List of Material The herbs and powders used in the present formulation work have been procured from authenticated suppliers and are research-grade. Some material obtained from pharmacognosy lab and some are obtained from marketed as mentioned below in table.[11]

Formulation Table:

Sr No.	Ingredients	Quantity
1	Psidium	10 ml
2	Amla Powder	8 gm
3	Neem powder	6 gm
4	Reetha powder	9 gm
5	Bhringraj powder	4 gm
6	Tragacanth / Acacia	4 gm
7	Sodium Lauryl Sulphate	3 gm
8	Methyl paraben	0.6 gm
9	Lavender Oil	q.s
10	Distilled Water	q.s

Formulation of Herbal Shampoo:

Decoction Method :

Weigh all the ingredients according to the formulation table.

1. Prepare Herbal Extract :

- Boil guava leaves, amla, neem, reetha, and bhringraj in 2-3 cups of water for 20 minutes
- Strain and cool the liquid.

2. Mix Base Ingredient :

- Combine the herbal extract with 1-2 tbsp SLS and mix well.

3. Add Thickener :

- Dissolve 1/2 tsp tragacanth gum in a little warm water and add to the mixture. Stir until thickened.

4. Add Preservative :

- Dissolve methyl paraben (0.1-0.2% of total volume) in warm water and mix into the shampoo.

5. Add Fragrance :

- Add 5-10 drops of lavender oil and stir well.

6. Store :

- Pour into a sterilized bottle. Label and store in a cool, dry place. Shake well before use.[12]

Evaluation Of Prepared Herbal Shampoo:

1. Physical Appearance:

The prepared formulation was evaluated for clarity, foam-producing ability and fluidity. [13]

2. pH Test : The pH of shampoo solution (10% w/v) in distilled water was determined at room Temperature. The pH of the shampoo was found to be in range of 6-7 which shows no harmful effect on scalp and hair. Both the formulations were shown pH nearer to skin required.[14]

3. Foaming ability:

5ml shampoo was placed in a test tube, which was covered with a hand and shaken 10 times. After a one-minute shake, the total volume of foam content. that was calculated was the foam volume.[10]

4. Presence of Sediments:

Hold the bottle or container against a light source to check for any settling particles.

5. Packaging Integrity:

Inspect the packaging for any damage, leakage, or visual flaws.

Result:

All the ingredients are combined together in adequate amount to make a homogeneous combination of all these ingredients mentioned in above formulation table No.1. This contains of variation of concentrations and weight in ingredients. From these formulation having good quality of product is considered as final preparation. The result showed that all ingredients used to formulation of shampoo were found to be safe. The formulated shampoo was clear and appearance was good. It demonstrated good froth stability, detergency, small bubble size, and execution of good conditioning.



Evaluation Parameter:

Sr No.	Evaluation Test	Observation
1	Colour	The colour of the sanitizer was reported as Dark Brown.
2	Odour	Pleasant.
3	Feel	The gel flows easily and does not feel too sticky

4	PH	Ranging Between 6 to 7
5	Spreadability	High-Spreadability
6	Viscosity	It should be Non-Sticky and Easy to Spread.

Conclusion:

The main purpose behind this investigation was to develop a stable functionally effective shampoo. It was found to be harmless and effective. The present study was carried out with the aim of preparing the herbal shampoo that provides smooth and straight effect on hairs, and safer than the chemical conditioning agent. The shampoo is enriched with beneficial constituents like polyphenol, flavonoids, saponins, vitamins, which contribute antibacterial, anti-hair fall which enhances the cleansing ability of shampoo and promote growth of healthy hair. The need of herbal shampoo is on demand at present due to lesser side effects, more effective than synthetic shampoos. Herbal shampoo was formulated with the decoction of medicinal plants that are commonly used for cleansing and smoothening hair traditionally. To provide the effective conditioning effect, the present study involves the use of guava, Reetha, Amla, Neem and Bhringraj and synthetic cationic conditioners. The present work focuses on the potential of herbal extracts from cosmetic purposes. Hence, we conclude that the formulation of herbal shampoo is effective in providing smoothing and shiny effect and better conditioning.

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