FORMULATION AND EVALUATION OF HERBAL HAIR CARE SHAMPOO

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Abstract- Shampoo is a hair care product used for the removal of dirt, oil, dandruff and other air pollutant. It is used for cosmetic preparation. It is antioxidant shampoo is helpful in increasing the blood circulation and thus help the hair growth as well as in the other treatment of hair diseases. The antioxidant property of plant and different herbs can be utilized in hair fall conditions. The main objective of this study was to eliminate harmful synthetic ingredient and stop the hair fall from shampoo formulation and substitute them with safe natural ingredients. All the ingredients used to formulate shampoo are safe and physiochemical evaluation showed ideal result. The aim of this study is to develop an herbal hair growth promoting shampoo using Piper Betel and Psidium Guajava leaves extract. The results of this study suggested that herbal shampoo formulation of leaves extract is good for the hair growth and control the other hair diseased.

Index words: Herbal shampoo, Piper betel leaves, Guava leaves, evaluation parameters, etc.

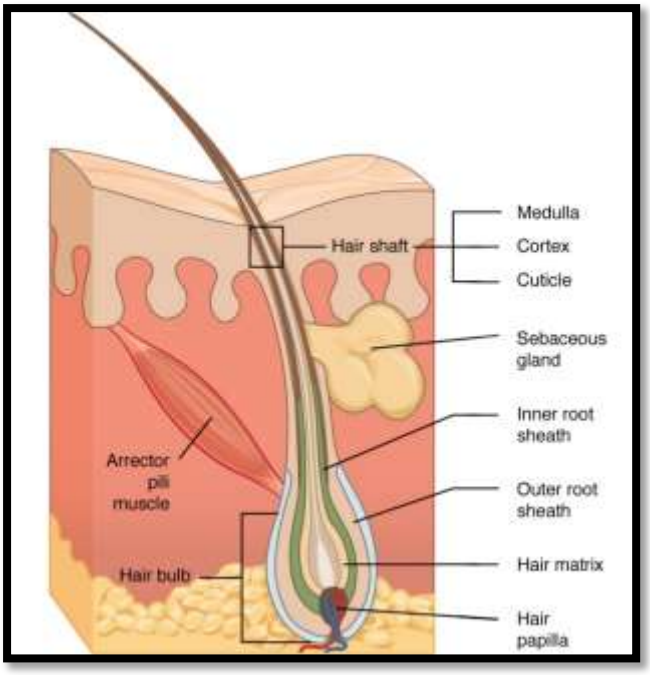
INTRODUCTION-

Hair is an important part of overall appeal of human body. There are many hair problems like thinning of hair, lack of hair volume, immature graying, conditioning, hair loss etc. have been observed by most of the individuals. Shampoo can also be defined as a cosmetic preparation used for washing scalp and hair packed in a form which is convenient for use. [1]

Hair structure-

Hair, protective appendages on the body and the structure of integument with sebaceous glands, sweat glands and nails are considered an important part of a body, derived from the skin ectoderm. They are also known as epidermal derivatives, since they originate from the epidermis during embryological development.[2]

Fig. No. 01 Structure of hair



Hair fall: It is thinning of hair on scalp. Alopecia is the term for hair fall, it can be permanent or temporary. Hair fall is the most common problem among all patients. Hair fall can occur due to various problems such as poor diet i.e., less protein intake etc., excessive hair coloring and styling, physical stress, deficiency of vitamin B and taking excessive amount of vitamin A. To overcome this problem many hair growth promoters can used such as Emblica officinalis (amla), Ocimum sanctum (Tulsi) etc. [3]

HERBAL SHAMPOO-

Herbal shampoos are defined as a preparation of surface-active material(surfactant) in suitable form solid, powder, or liquid which when used under the conditions specified will remove dirt, grease from the scalp and hair. It contains all-natural ingredients with herb extract. It helps to improve the quality of hair by providing shine, moisture, growth and strength to hair roots.

Natural cosmetics are popular one all over the world as they convey the impression of having better purity, safety, and efficacy. Herbal shampoo is a cosmetic preparation which uses herbs from plants and it is meant for washing of hair and scalp just like a regular shampoo. [4,5]

Fig No. 02 Herbal Shampoo

Benefits of Herbal Shampoo-

1. **Hair growth-** Herbal shampoos can stimulate hair growth and strengthen hair follicles. For example, aloe vera contains vitamin B12, which helps hair follicles enter the anagen or growth phase.
2. **Prevents hair loss-** Herbal shampoos can help prevent hair loss by eliminating dandruff, a leading cause of hair loss.
3. **Reduces dandruff-** Some herbal shampoos contain ingredients like Tulsi, which has antifungal and antibacterial properties that can help calm the scalp and reduce dandruff.
4. **Dry scalp-** Herbal shampoos can help reduce dryness and itchiness of the scalp.
5. **Eco-friendly-** Herbal shampoos are free of harmful chemicals like sulfate and silicone, which can pollute the environment.
6. **Preserves natural oils-** Herbal shampoos can cleanse the scalp and hair without stripping natural oils.
7. **Natural moisturization-** Herbal shampoos can hydrate hair follicles and roots to improve moisture in your hair.
8. **Suitable for all hair types-** Herbal shampoos are made from natural ingredients and are less likely to cause allergies or side effects than synthetic shampoos. Herbal shampoos are often made with natural herbs, plant extracts, oils, and other pure and organic ingredients. [6]

PLANT PROFILE-

1. **Guava Leaf-**

Fig. No. 03 Guava leaf

Botanical Name: Psidium guajava

Family: Myrtaceae

Genus: Psidium

Active constituent: Guava leaves contains 82.47% moisture, 3.64% ash, 0.62% fat, 18.53% proteins, 12.74% carbohydrates, 103 mg of ascorbic acid (vitamin C) and 1,717 mg of total phenolic compounds [mg of gallic acid equivalents (GAE)/g]. Phenolic compounds, flavonoids, tannins, essential oil.

Benefits of Guava leaves:

1. Promotes Hair Growth
2. Prevents Dandruff
3. Strengthens Hair
4. Improves Scalp Health
5. Prevents Premature Graying [7]

2. Piper betel leaves-

Fig. No. 04 Piper betel leave

Botanical name: Piper betel

Family: Piperaceae

Native region: Southeast Asia and India

Common names: Betel leaf, Paan

Chemical constituents: The main chemical constituents of Piper betle, commonly known as betel leaf, include chavibetol, chavibetol acetate, allyl pyrocatechol diacetate, eugenol, and safrole, among others. Betel leaf oil, a volatile liquid, contains various phenols like hydroxychavicol, eugenol, and betel phenol. The essential oil also comprises terpenes like caryophyllene, terpinolene, and cadinene.

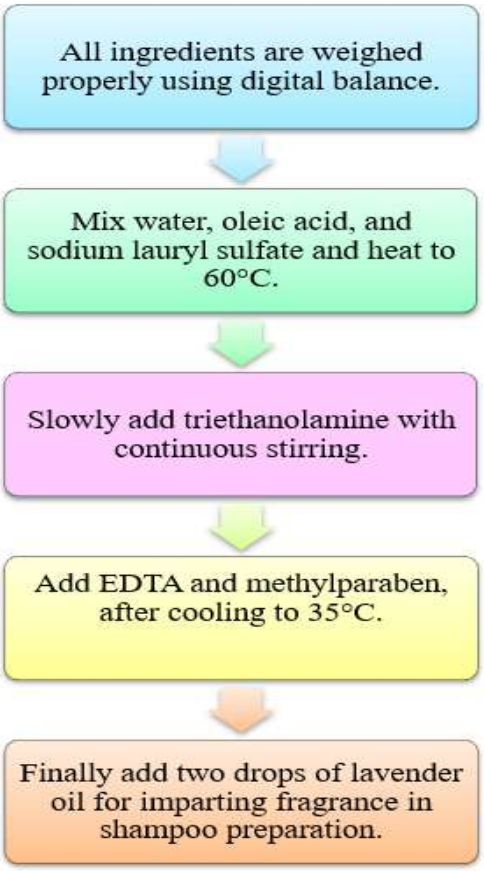
- **Benefits of Piper Betel leaves:**

Promoting growth, reducing hair fall, and improving scalp health. They are rich in vitamins (A, C, E) and minerals (iron, calcium, phosphorus), which contribute to stronger, healthier hair and scalp. [8]

MATERIALS AND METHOD-

Materials- Guava leaves extract, Piper Betel leaves extract, Sodium lauryl sulfate, Triethanolamine, Oleic acid, Methylparaben Lavender oil, EDTA, Water.

Methods-



Procedure of Herbal Shampoo Application:

1. First wet your hair thoroughly lake warm water
2. Take prepared Herbal Shampoo in a bowl as per requirement and add water to mix.
3. Mix well and apply over the Hairs. Massage the shampoo into your scalp using your fingertips
4. Allow the shampoo to sit on your hair for few minutes to let the herbal ingredients penetrate.
5. Rinse your hair thoroughly with lukewarm water, and repeat if needed. [9]

Formulation table-

Table no. 01 Formulation table

Sr. No.	Ingredients	Quantity (gm)
1.	Guava leaves extract (gm)	2
2.	Piper Betel leaves extract (gm)	4
3.	Sodium lauryl sulfate (gm)	8
4.	Triethanolamine (ml)	3.5
5.	Oleic acid (ml)	4

6.	Methyl paraben	0.25
7.	Lavender oil (drops)	2ps
8.	EDTA (gm)	0.15
9.	Water	q.s

EVALUATION PARAMETERS OF HERBAL SHAMPOO-

A. Physical Parameters-

1. **pH:** Measure the pH of the shampoo using a pH meter or pH paper. The ideal pH range for shampoo is between 5.5 and 6.5.

Soap based shampoos are most effective in p^H 9.0-10.0, synthetic detergent-based shampoos are effective in p^H Range of 6.0-9.0 can determine by using pH meter.

2. **Viscosity:** Measure the viscosity of the shampoo using a viscometer. The ideal viscosity range for shampoo is between 1,000 and 5,000 centi poise.
3. **Color and Clarity:** Evaluate the color and clarity of the shampoo. The shampoo should be clear and free of sediment.
4. **Texture:** Evaluate the texture of the shampoo. The shampoo should be smooth and free of grit. [10]

B. Chemical Parameters

1. Total Solids Content: Measure the total solids content of the shampoo using a refractometer or by drying a sample in an oven.

2. Surfactant Content: Measure the surfactant content of the shampoo using a surfactant analyzer or by performing a foam test.

% Total solid content (wt/wt) = (Wt of dry sample / wt of wet sample) × 100

3. pH Stability: Evaluate the p^H stability of the shampoo by measuring the p^H at different temperatures and over time.

4. Preservative Efficacy: Evaluate the preservative efficacy of the shampoo by performing a microbial challenge test. [11]

C. Biological Parameters

1. Antimicrobial Activity: Evaluate the antimicrobial activity of the shampoo using a microbial challenge test or by performing a zone of inhibition test.

2. Antifungal Activity: Evaluate the antifungal activity of the shampoo using a fungal challenge test or by performing a zone of inhibition test.

3. Irritation and Sensitization: Evaluate the irritation and sensitization potential of the shampoo using a patch test or a use test.

4. Comedogenicity: Evaluate the comedogenicity of the shampoo using a comedogenicity test. [12]

D. Performance Parameters

1. Foaming Ability: Evaluate the foaming ability of the shampoo by performing a foam test.

Ross Miles foam column is used for measuring height and stability. In this method 200ml of a shampoo solution falls through an orifice into a glass column containing 50 ml of the same shampoo solution. Height of the column is measured at specific times. The height of the column is considered to be proportional to the volume.

2. Cleansing Ability: Evaluate the cleansing ability of the shampoo by performing a soil removal test.

3. Moisturizing Ability: Evaluate the moisturizing ability of the shampoo by performing a moisturization test.

Percentage Moisture Content = $[(W_i - W_f) / Wi] \times 100$

Where, W_i is the weight at the beginning and W_f is the final weight of sample.

4. Stability and Shelf Life: Evaluate the stability and shelf life of the shampoo by performing a stability test [13]

E. Safety Parameters

1. Toxicity: Evaluate the toxicity of the shampoo by performing a toxicity test.

2. Irritation and Sensitization: Evaluate the irritation and sensitization potential of the shampoo using a patch test or a use test.

3. Allergenicity: Evaluate the allergenicity of the shampoo by performing an allergenicity test.

4. Environmental Impact: Evaluate the environmental impact of the shampoo by performing an environmental impact assessment.

5. Oral Toxicity: Oral Toxicity can be given in terms of LD 50 i.e. number of grams of material per kg of body weight requires to kill half of the test animal used. Rats are used for this test. [14]

RESULTS AND DISCUSSION-

Table no. 02 Results of evaluation studies

Sr. No.	Test	Batch 4
1.	pH	7.6
2.	Color & clarity	Greenish brown
3.	Dirt Dispersion	Light
4.	Foaming ability	Good
5.	Texture	Smooth
6.	Toxicity	No
7.	Irritation	No
8.	Allergenicity	No
9.	Cleansing ability	Good
10.	Viscosity	212cp
11.	Total solid content	3gm
12.	Moisture content	6.15%

CONCLUSION-

At present, time herbal cosmetic has marked up in personal care system and there is a great requirement for the herbal cosmetics in daily life. In this research article, formulate an herbal anti-hair fall and hair growth promoting shampoo containing betel leaves and guava leaves extract. Formulation was prepared containing betel leaves and guava leaves extract of different concentrations in combination and antioxidant activity was determined by taking ascorbic acid as standard.

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