



## FORMULATION AND EVALUATION OF HERBAL SHAMPOO FROM PIPER BETEL AND PSIDIUM GUAJAVA LEAVES

Pritam Dhonde \*<sup>1</sup>, Rohit Gandole, Sayali Amkar, Mukesh Kendre

<sup>1</sup>ACS's College of pharmaceutical science and research B.pharm, Ashti, Beed, Maharashtra, India.

**Abstract:** Shampoo is a hair care product used for the removal of dirt, oil, dandruff and other air pollutant. It is cosmetic preparation. It is antioxidant shampoo are helpful in increasing the blood circulation and thus help I 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. • The objective of this study is to formulate and evaluate herbal shampoo for cosmetic purpose from herbal ingredients.

**Keywords:** Herbal shampoo, Piper betel, Psidium guajava, antioxidant, Hair fall.

### INTRODUCTION

Herbal shampoos are shampoos infused with extracts of natural ingredients. The best thing about these shampoos is that they yield the best and long-lasting results. These Shampoos are free of harsh chemicals and cause no damage to the hair.

Natural cosmetics are popular one all over the world as they convey the impression of having better purity, and safety. The cleansing action of the synthetic cleansers / shampoo aims basically to remove oil content from the hair leaving the hair dry and damaged, whereas herbal shampoos aim at delivering essential nutrients to the hair and at the same time have a mild cleansing effect to remove the unwanted oily content.

#### Definitions:

- A shampoo is basically a solution of a detergent containing suitable additives for other benefits such as hair conditioning enhancement, lubrication, medication etc.
- Now-a-days many synthetic, herbal, medicated and nonmedicated shampoos are available in the market but popularity of herbal shampoo among consumers is on rise because of their belief that these products being of natural origin are safe and free from side effects.
- Herbal formulations are considered as alternative to synthetic shampoo but formulating cosmetics using completely natural raw material is a difficult task.
- There are large numbers of medicinal plants which are reported to have beneficial effects on hair and are commonly used in formulation of shampoo.
- These plant products may be used in their powdered form, crude form, purified extracts, or derivative form (Pooja et al., 2011).
- It is extremely difficult to prepare a herbal shampoo using a single natural material that would be milder and safer than the synthetic ones, and at the same time would compete favorably with its foaming, detergency and solid content. We, therefore, considered to formulate a pure herbal shampoo using traditionally and commonly used plant materials for hair washing in India.

Biotin is essential for the production of a hair protein called keratin, which is why biotin supplements are often marketed for hair growth. Research has also shown that consuming more biotin can help improve hair growth in people with a biotin deficiency.

### Ideal characters of herbal shampoo:

1. Should effectively and completely remove the dust, excessive sebum.
2. Should effectively wash hair.
3. Should produce a good amount of foam
4. The shampoo should be easily removed by rinsing with water.
5. Should leave the hair non dry, soft, lustrous with good, manageability.
6. Should impart a pleasant fragrance to the hair.
7. Should not make the hand rough and chapped

### COMPOSITION OF HERBAL SHAMPOO:

1. Active agents
3. Conditioning agents
4. Anti-dandruff
5. Thickening agents
6. Sequestrates
7. Colours, perfume and preservatives.

### Types of shampoo:

Shampoos are of the following types:

1. Powder Shampoo
2. Liquid Shampoo
3. Lotion Shampoo
4. Cream Shampoo
5. Jelly Shampoo
6. Aerosol Form Shampoo
7. Conditioning shampoo
8. Antidandruff shampoo
9. Baby shampoo
10. Two-layer shampoo

The purpose of using herbal shampoo is to remove dirt that is build up on the hair without stripping out much of the sebum. There are no. of medicinal plants with potential effects on hair used traditionally over a years around the world and are incorporated in herbal shampoo preparation.

*Piper betel* Linn. Belongs to family *Piperaceae*. In that species is piper siriboa L. Common name of Piper Betel is Betel, Betel Vine, Betal Pepper, Pan, Sireh. Bitel or pan leaves are used in Ayurveda to prepare medicines to treat hair related issues l like hair fall and hair loss. Using betel leaves on your hair helps in preventing any such hair issues.

Betel leaves are known to prevent hair loss and promote hair growth. Another way of using these leaves is by applying this anti-hair fall mask. According to Ayurveda, betel leaves are known to treat issues like hair fall. Using betel leaves regularly helps in quick hair growth. They condition the hair and make your hair thick and long. It also helps in treating issues like itchiness, dandruff, and split ends. The betel plant is an evergreen and perennial creeper, with glossy heart-shaped leaves. Betel leaves for hair loss are powerful because the content of polyphenols and flavonoids in betel leaf serves as an antioxidant and anti-inflammatory that can protect the hair from broken which is caused by inflammation of skin diseases and free radicals that cause hair loss on the head. Paan or betel leaves are most commonly used in Indian households during religious ceremonies. Also, paan is a traditional preparation that is usually consumed as a sweet post-meal. However, do you know the betel leaves use. These heart-shaped leaves are also known as Green Gold. They are being used in Indian medicine for ages now.

**MATERIAL AND METHODS****MATERIALS:**

Betel leaves were purchased from the local market of Ratlam and guava leaves were collected from local region.

**Extraction process:****Extraction of betel leaves using distilled water as a Solvent:**

Betel leaves were extracted using water as a solvent. The extraction was carried out using heating mantle and beaker of 1000 ml. Leaves were dried under shade and dried powder leaves was used for extraction. About 30 g of powdered leaves were boiled with 900 ml of water at 50°C to avoid degradation of phytochemical for 4 h, extract was filtered.

**Extraction of guava leaves using distilled water as a solvent:**

Guava leaves were extracted using water as a solvent. The extraction was carried out using heating mantle and beaker of 1000 ml. Leaves were dried under shade and dried powder of leaves was used for extraction sample of 50 g guava leaves in 1 L distilled water was boiled for 4 h at 100°C. The sample was then filtered.

**Table 1: Formulation for Preparation of Herbal Shampoo**

Ingredients	Quantity	Uses
Piper bitle leaves extract	2 ml	Antidandruff agent
Psidium guajava leaves extract	2 ml	
Oleic acid	4 ml	
Sodium lauryl sulphate	2.5 gm	Foaming agent
Triethanolamine	3 ml	
EDTA	0.15 gm	
Methyl paraben	0.2 gm	Preservative
Tween 80	1 ml	Preservative
Rose oil	q.s.	
Citric acid	q.s.	Maintain the pH
Water	q.s.	Vehicle

**FORMULATION OF HERBAL SHAMPOO:**

- The plant extracts are mixed in different proportions to obtain a shampoo whose formula is shown in below table.
- Herbal extracts were added to 10% gelatine solution and were mixed by shaking for 20 minutes.
- Methyl paraben were also added with stirring.
- Finally, the pH of the solution was adjusted by adding sufficient quantity of 1% citric acid solution.
- Few drops of rose essential oil were also added to impart aroma to the prepared shampoo and the final volume was made to 100 ml. with gelatine solution.

## EVALUATION PARAMETERS OF SHAMPOO:

### 1. Physical appearance /visual inspection:

The formulated herbal shampoos is evaluated for physical characteristics such as colour, odour, and transparency.

### 2. PH:

Most shampoos are formulated as either neutral or slightly alkaline to minimize the damage to hair. The pH of shampoo also helps to minimizing irritation to the eyes, enhances the quality of hair and maintain the ecological balance of the scalp.

### 3. % of solid content:

Good shampoos usually have 20%-30% solid content as it is easy to be applied and rinse out from the hair

### 4. Dirt dispersion:

The dirt dispersion is an important criterion for evaluation of cleansing action of shampoo. All shampoo concentrated the ink in the water portion, ensuring their satisfactory cleaning ability and actual effectiveness.

### 5. Foaming Ability and Foaming Stability:

Foaming or lathering is very important to the consumer and therefore, it is considered as an important parameter in evaluation of shampoo. The higher foaming property of formulated shampoo may be due to the combination of soap nut, shikakai and ziziphus.

### 6. Wetting Time:

The wetting ability of a surfactant is dependent on its concentration and is commonly used to test its efficacy. The canvas disc method is quick, efficient and reliable test to evaluate the wetting ability of a shampoo. The maximum of wetting time shows that the shampoo contains lower amount of detergents. Wetting efficiency is considered to be higher if the disc takes less time for sinking.

## METHOD OF PREPARATION OF HERBAL SHAMPOO

- 250 ml beaker take 50 ml water and add 250 4 ml oleic acid dissolve completely
- The add 6 gm sodium lauryl sulphate and stir heat gently at 60 °C .
- When both get dissolved reduced stirring speed and 3 ml of triethalonamine and continue String 5 min.
- After that EDTA and methyl paraben together were added and continue staring till it become clear liquid.
- In other beaker take 30 ml of water and add tween 80 and stir for 10 min and required Purity of plant extract were added.
- This liquid two phases added to above one and stir for 20 min.



**Fig. 1: Formulation of Herbal Shampoo**

**EVALUATION TESTS:****1. Physical appearance/ visual inspection:**

The formulation prepared was evaluated for the clarity, colour, odour and foam producing ability.

**2. Determination of pH:**

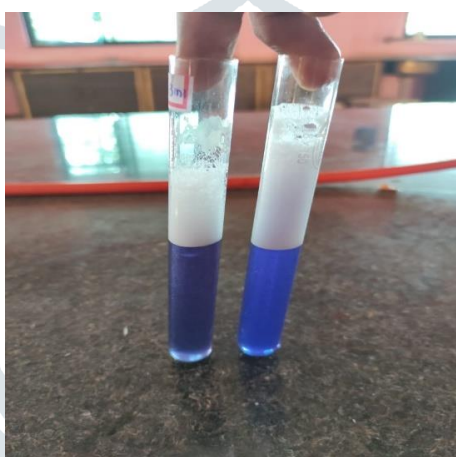
The pH of 10% v/v shampoo solution in distilled water was measured by using pH meter at room temperature.

**3. Determination of % of solid contents:**

4 grams of shampoo were placed in a previously clean, dry and weighed evaporating dish. The dish and shampoo was weighed again to confirm the of the shampoo. The liquid portion of the shampoo was evaporated by placing the evaporating dish on the hot plate. The weight and thus % of the solid contents of shampoo left after complete drying was calculated.

**4. Dirt dispersion test :**

Two drops of shampoo were added to 10ml of distilled water taken in a large test tube. To this solution, 1 drop of India ink was added and the test tube was stoppered and shaken 10 times. The amount of ink in the foam was indicated by the rubric such as none, light, moderate heavy.



**Fig. 2: Dirt Dispersion**

**5. Surface tension measurement:**

The surface tension of 10% w/v shampoo in distilled water was measured using stalagmometer at room temperature

**6. Test to evaluate foaming ability and foam stability:**

Foaming ability was determined by using cylinder shake method.

Briefly, 50 ml of the 1% commercial or formulated shampoo solution was placed into a 250 ml graduated cylinder; it was covered with one hand and shaken 10 times. The total volume of the foam content after 1 minute of shaking was recorded.



**Fig. 3: Foaming Ability Test**

**RESULT AND OBSERVATION:**

In the above two formulations. Formulation a show good activity

**Table 2: Observation Table**

Sr. No.	Parameters	Formulation A	Formulation B
1.	Colour	Light brown	Light brown
2.	Odour	Good	Good
3.	Texture	Clear	Clear
4.	Solid content	16.10 %	14.75 %
5.	Foaming ability	90+/-2	80+/-3
6.	Surface tension	74.9	80.73
7.	Dirt dispersion	Light	Moderate
8.	PH	5.34	5.62

**SUMMARY:**

In this project work of formulation of herbal shampoo following concepts are included Shampoo are probably the most widely used cosmetic product for cleansing hairs and scalps in our daily life. There are large number of medicinal plants which are reported to have beneficial effects on hair and are commonly used in formulation of shampoo. In this project work advantages, limitations, types of shampoo, composition of herbal shampoo, ideal characteristics of shampoo like it should effectively and completely remove the dust, excessive sebum, should effectively wash hair and produce a good amount of foam, and easily removed by rinsing with water, method of preparation of herbal shampoo, different evaluation test reports are included.

**CONCLUSION:**

At present, time herbal cosmetic has been marked up 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. The percentage inhibition of a combination formulation FC3 shows 88% as compared to ascorbic acid which shows 79% inhibition of DPPH and formulation was evaluated for general parameters such as pH, dirt dispersions, and appearance and it was stable for 2 months and it is best for the hair fall conditions, alopecia, because betel leaves and guava leaves are best for reducing hair fall or hair growth promoter and show best antioxidant activity and their combination formulation is not available in the market now. A need for this age is to prepare herbal cosmetics which will prove beneficial and has lesser side effects.

**REFERENCES:**

1. Singh K, Saeed F, Ahmad Z, Ahsan F, Shakya P. Alopecia Introduction and overview of herbal treatment. J Chem Pharm Res 2016; 8:59
2. Available from: <https://www.en.wikipedia.org/wiki/Hair>. [Last accessed on 2018 Jul 29].
3. Available from: <https://www.medicinenet.com/script/main/art.asp?articlekey=53390>. [Last accessed on 2018 Aug 03].
4. Katelin F, Rodrigues ST, Ledon J, Savasi J, Chacom A. Comprehensive overview and treatment update on hair loss. J Comet Dermat Sci App 2013;

5. Available from: <https://www.practo.com/health-wiki/hair-loss-alopecia-causes-symptoms-and-treatment/89/> article. [Last accessed on 2018 Aug 02].
6. Patel S, Sharma V, Chauhan NS, Thakur M, Dixit VK. Hair growth: Focus on herbal therapeutic agent. *Curr Drug Discov Tech* 2015; 12:1-22. Available from: [https://www.researchgate.net/profile/Nagendra\\_Chouhan/publication/278045537\\_Hair\\_Growth\\_Focus\\_on\\_Herbal\\_Therapeutic\\_Agent/links/55af72fd08ae6aa568b3a960/Hair-Growth-Focus-on-Herbal-Therapeutic-Agent.pdf](https://www.researchgate.net/profile/Nagendra_Chouhan/publication/278045537_Hair_Growth_Focus_on_Herbal_Therapeutic_Agent/links/55af72fd08ae6aa568b3a960/Hair-Growth-Focus-on-Herbal-Therapeutic-Agent.pdf). [Last accessed on 2018 Aug 02].
7. Shinde PR, Tatiya AU, Surana SJ. Formulation development and evaluation of herbal antidandruff shampoo. *Into J Res Cosmet Sci* 2013; 3:25-33.
8. Mahendran S, Noor din HA. Formulation and evaluation of herbal shampoo containing rambutan leaves extract. *Into J Pharm Bio Sci* 2016; 7:146-51.
9. Kumar S. The importance of antioxidant and their role in pharmaceutical sciences-a review. *Asian J Res Chem Pharm Sci* 2014; 1:27-44.
10. Young IS, Woodside JV. Antioxidants in health and disease. *J Clin Pathol* 2001; 54:176-86.
11. Fernandez E, Martínez- B, Armengol R, Barba C, Coderch L. Efficacy of antioxidants in human hair. *J Photochem Photobiol B* 2012; 117:146-56.
12. Available from: <https://www.newbeauty.com/blog/daily-beauty/7198-antioxidants-the-answer-to-aging-strands>. [Last accessed on 2018 Aug 02].
13. Dwivedi V, Tripathi S. Review study on potential activity
14. Palaniappan G, Sengottayan A, Sravanan T. Betel leaf: The green gold of India. *Facts* 2012; 2:21- 4. Available [Last accessed on 2018 Jul 30].
15. Available from: <http://www.greenlifehealthy.com/benefits-of-betel-leaf>. [Last accessed on 2018 Jul 30].
16. Altars GR, Brunnati CS, Ottoboni MB, Nicolau CT. Psidium guajava (Guava): A plant of multipurpose medicinal applications. *Med Aromat Plants* 2012; 1:1-6. Available from: [https://www.researchgate.net/publication/269549051\\_Psidium\\_guajava\\_Guava\\_A\\_Plant\\_of\\_Multipurpose\\_Medicinal\\_Applications](https://www.researchgate.net/publication/269549051_Psidium_guajava_Guava_A_Plant_of_Multipurpose_Medicinal_Applications). [Last accessed on 2018 Aug 02].
17. Available from: <https://www.hairlossable.com/guava-leaves-can-help-hair-grow>. [Last accessed on 2018 Aug 02].
18. Available from: <http://www.stylecraze.com/articles/how-are-guava-leaves-beneficial-for-your-hair/#gref>. [Last accessed on 2018 Aug 02].
19. Pin KY, Chuah AL, Rashih AA, Mazura MP, Fadzureena J, Vimala S, Rasadah MA. Antioxidant and anti-inflammatory activities of extracts of betel leaves (Piper betle) from solvents with different polarities. *J Trop Forest Sci* 2010; 22:448-55.
20. Seo J, Soojung L, Marcus LE, Sarah AJ, Kang J, Bahram HA. Study to find the best extraction solvent for use with guava leaves (Psidium guajava L.) for high antioxidant efficacy. *Food Sci Nutr* 2014; 2:174-80.
21. Noer L, Retno WK, Iim S, Maria RD. The Potency of guava Psidium guajava (L.) leaves as a functional immune stimulatory ingredient.
22. Mithal BM, Saha RN. A handbook of cosmetics. Vallabh prakashans 2013; 9:119.
23. Veeru P, Mishra PK, Mishra M. Screening of medicinal plant extracts for antioxidant activity. *J Med Plants Res* 2009; 3:608-12.
24. Yadav NK, Arya RK, Dev. K, Sharma C, Hossain Z, Meena S, et al. Alcoholic extract of Eclipta alba show, in vitro antioxidant and anticancer activity without exhibiting toxicological effects. *Hindawi Oxid Med Cell Longev* 2017; 18:1-8.
25. Badi KA, Khan AH. Formulation, evaluation and comparison of the herbal shampoo with the commercial shampoos. *J Basic and Applied Sci* 2014; 3:301-5.
26. Dessai P, Phatarpekar S. Formulation and evaluation of herbal shampoo and to compare formulated shampoo with marketed shampoos. *World J Pharm Pharm Sci* 2016; 5:1467-77.
27. Kumar A, Mali RR. Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos. *Int J Pharm Sci* 2010; 3:120-6.
28. Mendhekar YS, Tajane AS, Shitole BP, Jadhav S, Gaikwad DD. Formulation and evaluation of polyherbal shampoo and compared with marketed shampoo. *World J Pharm Pharm Sci* 2017; 6:1388-97.