

# Formulation And Evaluation of Herbal Shampoo

<sup>1</sup>Omkar S. Shipalkar, <sup>2</sup>Sitaram H. Madane, <sup>3</sup>Sahil R. Pagare,  
<sup>4</sup>Miss.Ankita A. Giramkar, <sup>5</sup>Dr Amol N. Khedkar

<sup>1,2,3</sup>Research Scholar, <sup>4</sup>Assistant Professor, <sup>5</sup>Principal

Department of Pharmaceutical Science

Saikrupa Institute of Pharmacy, Ghargaon, Ahmednagar, Maharashtra, India-413728

## Abstract:

The current study's objective is to create and assess a herbal shampoo powder with natural ingredients that is safe and effective. It cleans out debris and dandruff, encourages hair development and shine, and fortifies and darkens hair. Of all the hair care products, shampoo is most likely the most popular. Given that human hair is a unique and treasured trait, shampoos are among the cosmetics used on a daily basis. Hair care products are further defined as preparations intended for cleaning, altering the texture, changing the colour, revitalizing stressed hair, nourishing the tresses, and enhancing the appearance of well-groomed hair. Individuals with dandruff, colour-treated hair, gluten intolerances, or A combination of various herbal extracts and natural components is used to create the hair care product known as polyherbal shampoo.

Every herb has a special advantage, such as bolstering, feeding the hair, and improving luster. A increasing trend towards holistic and natural hair care treatments has created a need for polyherbal shampoos. These shampoos are designed for people looking for healthy substitutes that put their general health and hair vitality first. The many herbs include antioxidants, vitamins, and minerals that promote hair growth, lessen dandruff, and shield the hair from harm. They satisfy the growing desire for sustainable and eco-friendly solutions by providing a well-balanced combination of nature's goodness. Through accepting the authority.

The objective of the research was to create and assess a comprehensive herbal shampoo that solely utilized conventionally used plant components. Aqueous extracts of the following ingredients were found in the shampoo: fenugreek seeds, ginger rhizome, marigold petals, orange peel, hibiscus leaves, eucalyptus leaves, Bengal gram seeds, soap nut fruit, and rose petals. Using suggested protocols, the physicochemical characteristics-such as colour, clarity, pH, and skin irritationas well a s the percentage of solid contents, dirt dispersion, foaming ability and foam stability, wetting time, and stability studies were investigated. The polyherbal shampoo performed well in the organoleptic assessments.

The pH range of the polyherbal shampoo was 5.62, which is comparable to the pH of human skin. The prepared shampoo was determined to have a solid content percentage of 25.2%. The created shampoo's surface tension was measured and found to be 33.16 dynes/cm. This study's primary goal is to create and assess a polyherbal anti-dandruff shampoo that combats *Malassezia furfur* by utilizing natural components. The straightforward decoction method was utilized to extract the herbs. To enhance anti-dandruff action, All three formulations had stability tests for a month, during which time their physicochemical characteristics somewhat changed. It is possible to infer from the findings that the first formulation satisfies every evaluation parameter criteria. Polyherbal shampoo is a hair care product crafted from a blend of several herbal extracts and natural ingredients. Unlike conventional shampoos laden with synthetic compounds, polyherbal shampoos.

Harness the power of multiple plant-based components to provide a comprehensive approach to hair health. Each herb contributes unique benefits, such as strengthening, nourishing the scalp, and enhancing shine. The need for polyherbal shampoos arises from a growing inclination towards holistic and natural hair care

solutions. These shampoos cater to individuals seeking effective alternatives that prioritize both hair vitality and overall well-being. The varied herbs encompass vitamins, minerals, and antioxidants, fostering hair growth, reducing dandruff, and preventing damage. They offer a harmonious blend of nature's goodness, catering to the rising demand for environmentally-conscious and sustainable options. By embracing the power of plants, polyherbal shampoos embody the fusion of tradition and modernity, meeting the diverse needs of individuals in pursuit of healthier, more vibrant hair. This Polyherbal shampoo contains Shikakai, Rita, Aloe Vera, Neem, and Liquorice etc.

**Keywords: Herbal Shampoo, Evaluation, Standardization, Anti-Dandruff, Anti-microbial**

## **INTRODUCTION:**

The term Cosmetic is derived from the Greek word *Cosmetics* which means **cosmesisor** beautifying substance. Cosmetics are substances used to enhance the appearance of the human body. Cosmetics include skin-care creams, lotions, powders, perfumes, lipsticks, fingernail and toe nail polish, eye and facial makeup, permanent waves, colored contact lenses, hair colors, hair sprays, and gels, deodorants, baby products, bath oils, bubble baths, bath salts, kinds of butter and many other types of products are in great demand in both developing and developed countries.<sup>[1]</sup>

Hair plays an important role in human life .Hair is one of the external barometers of internal body conditions. Shampooing is the most common form of hair treatment. The primary function of shampoo is aimed at cleansing of the hair necessitated due to accumulated sebum, dust, scalp debris etc.<sup>[2]</sup>.

Herbal shampoos are concerned with stability criteria, depending upon the nature of the ingredient the may be simple or plain shampoo, antiseptic or antidandruff shampoo, and nutritional shampoo containing vitamins, amino acids, proteins hydro lysate. The active ingredients for haircare powders are based on the ability of the ingredient to prevent skin damage as well as to improve the quality of the skin by cleansing, nourishing, and protecting the skin. As herbal shampoos are concerned instability criteria.<sup>[3]</sup> The major ingredients used in making a shampoo are detergents (surfactants), conditioning crease its selection of stability and safety.

## **CLASSIFICATIONS OF SHAMPOO:<sup>[4]</sup>**

### **A. Based of Appearance:**

- a) Powder shampoo
- b) Liquid shampoo
- c) Gel shampoo
- d) Oil shampoo

### **B. Based on use or function:**

- a) Conditioning shampoo
- b) Antidandruff shampoo
- c) Baby shampoo
- d) Clarifying shampoo

### **C. BasedonOrigin:**

The skin on our heads produce a greasy fluid called sebum .It produced to protect the hair v by coating itself

allover the head.

**The ideal characteristic of herbal shampoo:<sup>[5]</sup>**

- a) Should be effectively wash hair.
- b) Should be produce good amount of foam
- c) The shampoo should be easily removed by rinsing with water.

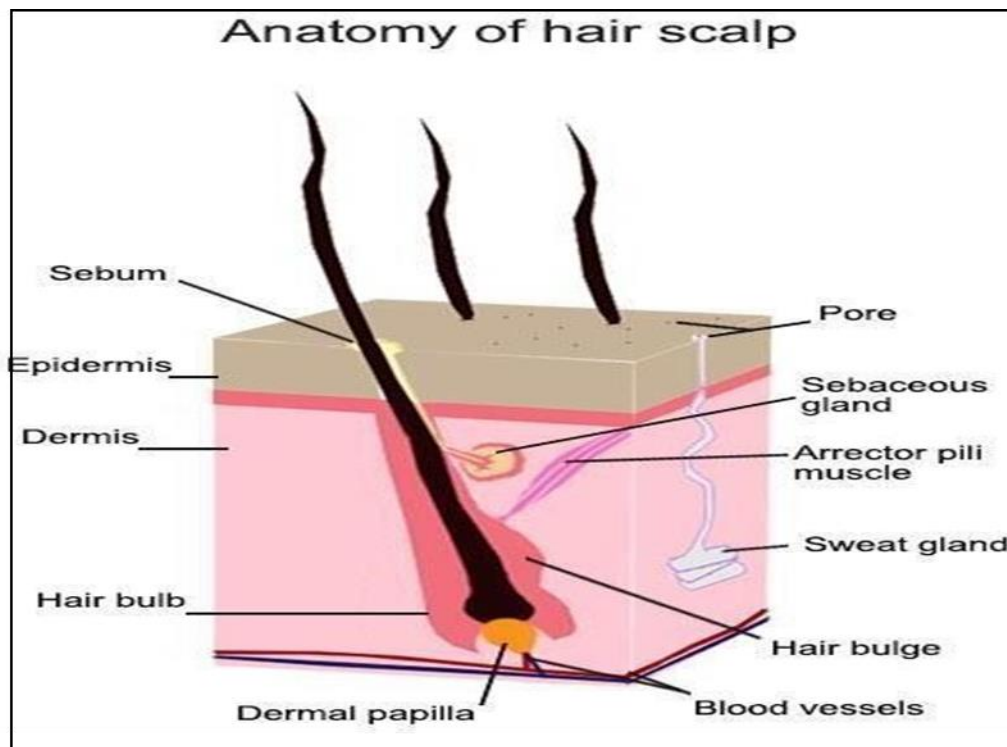
**Composition of shampoo:<sup>[6]</sup>**

- a) Surfactant
- b) Antidandruff agents
- c) Conditioning agents.
- d) Pearlescent agents
- e) Sequestrates
- f) Thickening agents
- g) Colours, perfumes and preservatives.

**ABOUT SCALP AND HAIRS:<sup>[7]</sup>**

Covering the surface of our head, the scalp, extends from the top of your forehead across to the epicranial Apo neurosis of the head. Laterally, it reaches down to the external auditory meatus and zygomatic arch (cheekbone of the skull). The scalp consists of 5 distinct layers:

- 1. Skin
- 2. Connective tissue
- 3. Epicranial Apo Neurosis
- 4. Loose connective tissue
- 5. Per cranium (periosteal)



**Fig.1: Anatomy of hair scalp**

### **PROBLEMS RELATED TO HAIR:**

- Dandruff
- Dry hair
- Split ends
- Oily hair
- Frizzy hair
- Limp hair
- Hair loss
- Heat damage
- Color damage
- Gray hair

### **Dandruff:**

This benign, long-term ailment manifests when the scalp turns greasy or dry, resulting in white.

- For those who have it, dandruff can be embarrassing even if it is harmless.

Since new skin cells are constantly growing on the scalp, the shedding of old skin cells is a normal process. However, skin cells shed more quickly than usual when one has dandruff. White flakes are the result of skin cells sticking together due to oil build-up on the scalp.

### **CAUSES OF DANDRUFF:**

1. Dry skin.
2. Irritated, oily skin.
3. Not shampooing often enough
4. Other skin conditions:

A. Eczema

B. Psoriasis

C. Seborrheic dermatitis

1. Malaysia-yeast like fungus
2. Sensitivity to hair products (contact dermatitis)

**Treatment:**

- ☐ Follow a healthy diet.
- ☐ Avoid stress.
- ☐ Shampoo use a combination of special
- ☐ Ingredients to control dandruff.

**Shampoo:** A Shampoo is a preparation of a surfactant in a suitable form –liquids, solid or powder-which when used under

The specified conditions will

- ☐ Remove surface grease
- ☐ Dirt and
- ☐ Skin debris

From the hair shaft and scalp without adversely affecting the user

**Advantages of Shampoo:**

- ☐ improving hair hygiene.
- ☐ Treating scalp conditions
- ☐ Treatment for dry scalp
- ☐ Treatment for hair loss.
- ☐ Treatment for greasing or oily hair.
- ☐ Relieves itch and irritation
- ☐ Repairs damaged hair.
- ☐ Shampoo keeps hair silky or smooth.

**Structure of Hair:**

In this context it's the character of the hair shaft which is of primary interest. It's structure is also described as Follows. The greater part of the shaft is made of elongated keratinized cells linked together to create the cortex of the hair fibre. The cortex is enclosed by a cuticle derived from one strand of cells within the bulb of the Foundation, which becomes a surface structure of the hair fibre five to 10 cell layers thick

**Part of Hair:** Dermal papillae: The dermal papilla is responsible for regulating the hair cycle and hair growth, and is also comprised of androgen receptors that are sensitive to the presence of Dot-matrix: The matrix surrounds the dermal papillae and contains all the active cells needed for hair growth and for the development of the different parts of the hair, particularly the outer root sheath, the inner root sheath and the hair shaft. Combined, the matrix and the dermal papillae make up the hair bulb. Outer root sheath: The outer root sheath, or trochleae, is the outermost part of the hair and is keratinized. It covers the entire hair follicle inside the dermis and then transitions through to the epidermis, providing the hair follicle with an opening from which to surface from. Inner root sheath: inner root sheath is comprised of three parts: the Henley

layer, Huxley layer, and cuticle. The Henley's and Huxley's layers are capsular layers that anchor onto each other with the purpose of stabilizing the hair. The cuticle, which is the innermost part that is closest to the hair shaft, is made from dead and lustrous looking hairs.

#### DRUG AND EXCIPIENT PROFILE:

##### 1. Shikakai:-

- **Synonym-** Satala, Virala, Tatphala.
- **Biological Source-** Dried fruits of *Acacia Concinna* belonging to **family Fabiaceae**.
- **Organoleptic Properties-** Color-Dark brown. Odour-Characteristics.
- **Chemical Constituents-** The chemical constituents of shikakai are, Spinosterol, Acacia acid, Lactone, Glucose, Arabinose.



**Fig 1: Shikakai**

##### Uses-

- Shikakai gives healthy, beautiful and bouncy hair causes you to look beautiful.
- It is rich in anti ophthalmic factor, D, E and K and other antioxidants which are very essential for healthy and quick growth of hair naturally
- Shikakai is employed in many shampoos and hair medicines for its hair strengthening and conditioning properties.

##### 2) Reetha

- **Synonym-** Reetha, Soapnut, Washnut, Aritha.
- **Biological Source-** It is dried fruits of species of **Sap Indus Mukorossi** belong to **family Sapindaceae**.
- **Organoleptic Properties-** Color-Dark brown to Black Odour-Characteristics Taste-Bitter
- **Chemical Constituents-** The main constituent of reetha is Saponins. Other constituents are, Saponic acid, Oleanolic acid, Saponin do side A&B, Mukuroziosides, Trifoliosid





**Fig 2:Reetha**

#### Uses-

- Reetha is employed because the main ingredient in soaps and shampoos for laundry hair, because it is taken into account good for the health of hair.
- Reetha is additionally used for removing lice from the scalp, because it has gentle insecticide properties.
- It is employed as cleanser, surfactant .In addition, it's used for the treatment of eczema, psoriasis, and for removing freckles.
- The plant is thought for its antimicrobial properties.

#### 3)Amala:-

- **Synonym:** Emblic, emblic myrobalan, myrobalan, Indian gooseberry, Malacca tree
- **Biological Source:** Phyllanthus emblica L. (popular known as amla or Indian gooseberry) is an ephemeral tree belonging to the Euphorbiaceous family.
- **Organolptic properties:** Alma is sour and astringent in taste, with a fresh, slightly herbal aroma, and it's a small, round fruit with greenish-yellow skin.
- **Chemical Constituents-**Alma, also known as Indian gooseberry, contains various chemical constituents including vitamin C, polyphenols, flavonoids, tannins, and minerals like calcium, phosphorus, and iron.



**Fig 3: Amla**

**Uses:**

- Amla is often used in hair oils and shampoos to promote hair growth, prevent premature graying, and strengthen hair follicles.
- Amla is used in shampoo for its ability to promote hair growth, prevent premature graying, strengthen hair follicles, improve scalp health, add shine, condition the hair, and protect against environmental damage.

**4) Liquorice:-**

- **Synonym:** Sweetwood, Glycyrrhiza,
- **Biological source:** The biological source of liquorice is the root of the Glycyrrhiza glabra plant
- **Organoleptic properties:** The organoleptic properties of liquorice include a distinct sweet taste, a characteristic aroma, and a chewy texture.
- **Chemical Constituents:** The chemical constituents of liquorice include glycyrrhizin, flavonoids, saponins, cucumarins, and various other compounds. These contribute to its flavor, sweetness, and potential health benefits.



**Fig 4: Liquorice**

**Uses:**

- Licorice extract is sometimes used in shampoo for its potential benefits for hair and scalp health.
- Licorice contains compounds like glycyrrhizin and flavonoids that have anti-inflammatory, smoothing, and scalp-conditioning properties.
- In shampoo formulations, licorice extract may help to calm irritation, reduce dandruff, and promote overall scalp health.



### 5) Aloe Vera

- **Synonym:** Aloe Barbadensis
- **Biological Source:** Aloe is dried latex of leaves of it
- **Family:** Asphodelaceae
- **Part Used:** leaves
- **Chemical Constituents:** Lupeol, salicylic acid, urea nitrogen, cinnamom acid, phenols sulfur



**Fig 5: Aloe Vera**

#### Uses:

- Aloe vera help with dandruff relief.
- Aloe vera help promote healthier hair.
- It is commonly used to soothe sunburn, moisturize the skin, promote wound healing, reduce inflammation, and can be applied to hair for hydration

#### MATERIALS AND EQUIPMENT:

#### Ingredients used in formulation with uses:

Sr. No	Ingredients	Uses
1	Shikakai	Hair growth
2	Reetha	good for the health of hair
3	Amala	hair growth, prevent premature graying
4	Liquorice	anti-inflammatory, smoothing
5	Glycerin	keeping it soft and hydrated
6	Xanthium Gum	Thickening agent
7	Aloe Vera	Smoothing agent
8	Sodium lauryl sulphate	Detergent in cosmetics, Foaming agent
9	Potassium sorbate	Preservative
10	Lemon Oil	Reduction bacteria

**Table No.1:Ingredients and their uses**

**Equipment's:**

1. Heating mantle
2. Beaker
3. Stirrer
4. Conical flask
5. Funnel
6. Weighing balance
7. Measuring cylinder
8. pH meter
9. test tube
10. Ostwald viscometer

**MATERIAL AND METHAOD:****Collection of plant material:**

. Shikakai, Reetha, Alma liquorice were procured from local market.

**Authentication of herbal plant :**

alltheherbauthenticatetheplantmaterialwasidentifiedandauthenticatedinM.J.SCollage,shrigonda Dist  
Ahemadnagar.(Head of department of Botany).

**EXPERIMENTALWORK:[18-19]****Identification tests:**

Identification test screening for the presence of some chemical constituents in ficusbenghalensis.  
Identification test were carried out adopting standards procedure.

**1) Test of vitamin C :**

1mlof sample solution + Add 2ml of water.+1dropof sodium nitroprusside.+ 2ml of sodium hydroxide + add drop wise HCL + yellow colour is formed .vitamin C is present.

**2) Test of Vitamin E:**

3) 1ml of sample solution + 2ml of and 0.1 g sodium bicarbonate + 2ml of ferroussulphate + shake and allow to stand and violet colour is form +add sulphuric acid drops +colour is disappear.

**3) Test of saponin:**

4) 5ml extract was mixed with 20ml of distilled water then agitate din graduated cylinder for15min  
formation indicates saponin.

**4)Test Of tannins:**

5) 4ml extract was treated with 4 ml  $\text{FeCl}_3$  formation of green colour indicates that presence of condensed tannin.



**Fig 10: Identification test**

**[A] Extraction of shikakai and Reetha**

**By decoction method:**

Take 5 gram shikakai powder and 5 gram Rita powder in beaker



Add 50 ml of distilled water in beaker stir the powder continuously and boil the mixture on water bath until 20 ml water reduced.



Then mixture filtered through muslin cloth ,and the resulted filtrate was collected in a beaker

**[B] Extraction of Amala and Liquorice**

**By decoction method:**

Take 15 gram amala powder and 6 gram liquorice powder in beaker



Add in 105 ml of distilled water in above mixture and then mixed properly



Boil the mixture on water bath until one part of portion of mixture remain



The mixture was then filtered through muslin cloth ,and the resulted filtrate was collected in a beaker



Take 2 gram Xanthum gum ,10 ml Glycerin and 5 gram Sodium lauryl sulphate in above the extract



Then continuously mixing until bubbles are removed Take 5 ml of Lemon oil and add in above mixture and mixed properly





And filled in closed plastic bottle



Then filtrate of Shikakai and Reetha add in filtrate of amla and Lliquorice

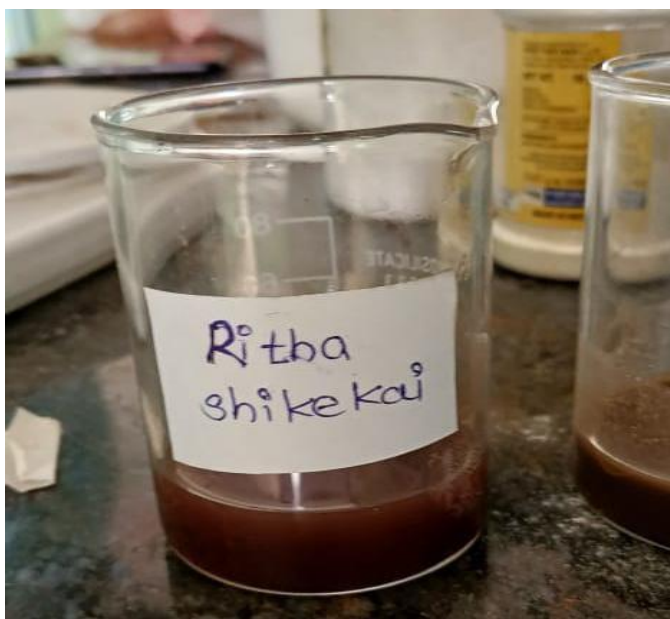


Then mixing the both extract properly.

### 1. Decoction process:<sup>[21]</sup>

- Banyan tree arial tree Drumstick, hibiscus leaves ,Senna leaves is one part of in beaker.
- Then Shikakai, nagarmotha, and reetha was prepared another part of water.
- Lavender oil was added for fragrance.

### Formulationtable:



Sr.No	Ingredients	F1	F2	F3	F4
1	Banyantreeaerialroots	10%	11%	13%	11.5%
2	Drumstick	11%	10%	10%	9.5%
3	Hibiscus leaves	10%	9.5%	7.5%	10%
4	Senna leaves	8%	8.5%	8%	9%
5	Shikakai	10.5%	12.5%	10%	11%
6	Nagarmotha	8.5%	6.6%	9%	7.5%
7	Reetha	9.5%	9%	9.5%	7.5%

8	Sodium lauryl sulphate	28%	30%	30%	30%
9	Potassium sorbate	2%	2.5%	2.5%	1.5%
10	Lavender oil	0.5%	0.5%	0.5%	0.5%

**Table No- 2 Formulation of Herbal Shampoo**

### **EVALUTIONPARAMETER:<sup>[20]</sup>**

#### ➤ **Evaluation of poly herbal shampoo:**

parameters. The formulated herbal oil was evaluated for parameters like pH value, viscosity, foam stability testing, dirt dispersion test, skin sensitivity test and organoleptic parameters.

- **Organoleptic parameter:**

In this test colour, odour, texture, and state of shampoo.

- **Viscosity:**

Viscosity was determined by using the Ostwald viscometer

- **Foam stability test:**

Cylinder shake method was used for determining foaming ability. 50 ml of the 1% shampoo solution was put into a 250ml graduated cylinder and covered the cylinder with hand and shaken for 10 times were recorded. The total volumes of the foam contents after 1 minute shaking. The foam volume was calculated only. Immediately

- **pH test:** pH of the herbal shampoo was determined unsighted.

- **Dirt dispersion test:** Two drops of shampoo were added in large test tube contain 10ml of distilled water. One drop of ink was added in the test tube, was stopped and shake for ten times. The amount of ink in the foam estimate as none, light, moderate or heavy.

- **Skin irritation test:** Applied the solution of prepared shampoo on skin and kept for 5 minutes. Observed for redness of skin and irritation there, were no any red coloration and their reaction to the skin.

- **Stability Study:** Stability study was performed by keeping the prepared herbal shampoo in a closed container at cooled and dry place.



**Fig 11. Herbal shampoo**

**RESULT:**

**Organoleptic Property:**

Sr.No	Parameter	F4
1	Colour	Brown
2	Odour	Characteristic.
3	Texture	Smooth
4	State	Semisolid

**Table No 3: Organoleptic Property.**

**Viscosity:**

Sr no	Formulation	Viscosiy(centipoise)
1	F6	1885

**TableNo 4: Viscosity**





**Fig No.12 Viscosity Test**

**Foam stability test:**

**Foam height:**

Sr.No	Formulation	Minutes	Foam height
1	F6	10	14.5 cm

**Table No. 5: Foam height**



**Foam retention:**

Sr.No	Formulation	minutes
1	F6	10 min

Table No 6: Foam retention



Fig No-14 Foam retention

**pH test:**

Sr.No	Formulation	pH determination
1	F6	6.52

Table No 8:PH test



Fig No.15:pH Meter

**Dirt dispersion test:**

Sr no	Formulation	Result
1	F6	Moderate



**Fig No.16: Dirt Dispersion**

**Skin sensitization test:**

Sr.No	Formulation	Irritant Effect	Edema
1	F6	Nil	Nil

Table No 9: skin sensitization test



**Fig No.17 Skin sensitization test**

**Formulation Results:**

Sr.No	F1	F2	F3	F4	F5	F6
Colour	Lightbrown	Lightbrown	Brown	Brown	brown	Darkbrown
Odour	Characteristic.	Characteristic.	Characteristic.	Characteristic.	Characteristic.	Characteristic.
Texture	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth
state	Semisolid	Semisolid	Semisolid	Semisolid	Semi solid	Semisolid
Viscosity	1778	1781	1975	1800	1876	1885
Foam height	10cm	11cm	11.5cm	12.5cm	13cm	14.5cm
Foam Retention	10min	11min	11min 15sec	11min 55sec	12min	12min 46sec
pH determination	6	6.42	5	6	6.12	6.52
Dirt determination test	Light	Light	Light	Heavy	Heavy	Moderate
Skin sensitization	None	None	None	None	None	None

**Table No 10: Stability study of Herbal shampoo****CONCLUSION:**

The formulated shampoo were not only safer than the /chemical conditioning agents, but also greatly reduce the hair loss during combining as well as strengthens the hair growth. The pH of the shampoo was adjusted to 5, to retain the acidic mental of scalp. The physicochemical approach used for preservation of the formulations to avoid .

The present study was carried out with the aim of preparing the herbal shampoo that reduces hair loss during combing, safer than the chemical conditioning agents as wells to strengthen the hair growth. Herbal shampoo was formulated with the aqueous extract of medicinal plants that are commonly used for cleansing hair traditionally. Use of conditioning agents (synthetic) reduces the protein or hair loss. To provide the

effective conditioning effects, the present study involves the use of Shikakai, alma, cationic conditioners. The main purpose behind this investigation was to develop a stable and functionally effective shampoo by excluding all types of synthetic additives, which are in such formulations. To evaluate for good product performance of the prepared shampoo, many tests were performed. The results of the evaluation study of the developed shampoo

## REFERENCE:

1. Ali HS, kadhim RB: Formulation and evaluation of herbal shampoo from Ziziphus Spina leaves .Int J Res. Appl Pharma 2011;2; 2018-6
2. Shinde PR. Taty A V, Surana ST, Formulation and evaluation of herbal antidandruff Shampoo .INTJ Res. Cosmet Sci.2013; 3(2);25-33
3. Arora R, Rathore KS. Bharkatiya M. Formulation and evaluation of herbal Shampoo by extract of some plant. The pharmaceutical and chemical Journal 2019;6(4); 74-80.
4. Monika Wghmode, Dr Hinane L. D. Formulation and evaluation of herbal Shampoo.2022;10(4);
5. Pralay Barhewar, Dipali Salve, Swejal Thale. Formulation and evaluation and Comparison of herbal shampoo. International Journal of Pharmaceutical research;2022; 7(3)279-285.
6. T. Satyanarayan, D. Nirmala Kumari, Formulation and evaluation of polyherbal Shampoo powder, IJPPR 2022; 24(3).
7. Chandran S Vipin KV, Augusthy AR, Lindumol KV, Shirwar A Development and Evaluation of antidandruff shampoo based on natural source. J Pharma Phototherapeutics 2013;1(4): 10-4
8. Ashwini V Jadhav .Dipak morale, Abhijit Daunderkar, Nikhil. Bhujbal, Dr. sandip Kshirsagar, Herbal hair cosmetic – A overview, Ashwini et.al shampoo antidandruffWorld of Herbal Pharma sci 2018;6(9) : 144-152
9. Priya D .Gaikwad, Kamini V. Mulay, Madhavee D. Borade, Formulation and Evaluation of herbal shampoo. IJSR 2018.
10. Aniket Pawar, Rakesh Pomnar, Mahesh Sawant, Rohit Aher, Komal Suryavanshi – Formulation and evaluation of herbal shampoo IJCRT – 2012; 10(7) .
11. Vijayalakshmi A, Sangeetha S. Ranjit N herbal shampoo, Asian Journal of Pharma And clinical Research 2018 ; 11(4)
12. Revansiddappa M. Shradha R. Abbulu, Formulation and evaluation of herbalAntidandruff shampoo, 2018; 7(4) 764-767.
13. Sachin Gholve, Sachin Nadarge, Sunil Hindole, Omprakash Bhusnure, Pratap and Sanjay Thonte, formulation and evaluation of poly herbal antidandruffShampoo, world journal of pharmaceutical Research 1711-1731
14. Wani Snehal, Kot Nitin, Buchake Vaibhav, preparation and evaluation of antidandruff polyherbal powder shampoo ,Pharmaceutical International research Journal,2014;5(4);77-84
15. Dhayanithi S, Enjamamul HOQUE, Pallavi N. Dr Kavitha PN, Dr saraswathi. Formulation and evaluation of herbal shampoo, national Journal of pharmaceutical sci. 2021;1(2);88-93
16. Aniket Pawar, Rakesh Pomnar, Mahesh Sawant, Rohit Aher, Komal Suryavanshi – Formulation and evaluation of herbal shampoo IJCRT – 2012; 10(7)
17. Debra Rosa. Wilson what you should know before using that product that contain potassium sorbate (Internet) Healthcare 2018 available [https:// www.Healthcare. com/health potassium sorbate](https://www.Healthcare.com/health/potassium-sorbate).
18. Dr.KR Khandelwal practical pharmacognasy 19th edition nirali publication; 2018
19. Indian pharmacopeia
20. Sachin Gholve, Sachin Nadarge, Sunil Hindole, Omprakash Bhusnure, Pratap Bosal and Sanjay

Thonte , formulation and evaluation of poly herbal antidandruff shampoo , world journal of pharmaceutical Research 1711-1731

21. Priya D .Gaikwad, Kamini V .Mulay, Madhavee D. Borade , Formulation and evaluation of herbal shampoo. IJSR 2018