



# Formulation And Evaluation Of Hair Serum From Aerial Roots Of Banyan Tree

Names of authors- Ms. Rodage Sonal Mahadev, Ms. Domale Snehal Dattatray, Ms. Jamble Snehal Dnyandeo, Ms. Hole Komal.

Name of Department - Pharmacognosy & phytochemistry

Name of organisation - Institute of pharmaceutical science and research (for girls), Swami chincholi ,Tal- Daund, Dist-Pune.

## Abstract:

Both men and women are quite concerned about hair loss, and the primary issues that come along with it are dandruff, hair falling out, and hair fading. The primary goal of this hair serum formulation was to address hair issues such as hair fall, dandruff, and other related issues. We choose rosemary essential oil and *Ficus bengalensis* roots for the manufacture of hair serum. The roots of *Ficus bengalensis* are excellent for promoting hair development and reducing hair loss. The phytosterols, protein, flavonoids, phenolic content, and glycoside found in these roots are beneficial to hair. After the creation of the hair serum, evaluation tests can be run, and it was successful in determining the viscosity, pH, and colour.

## Keywords:

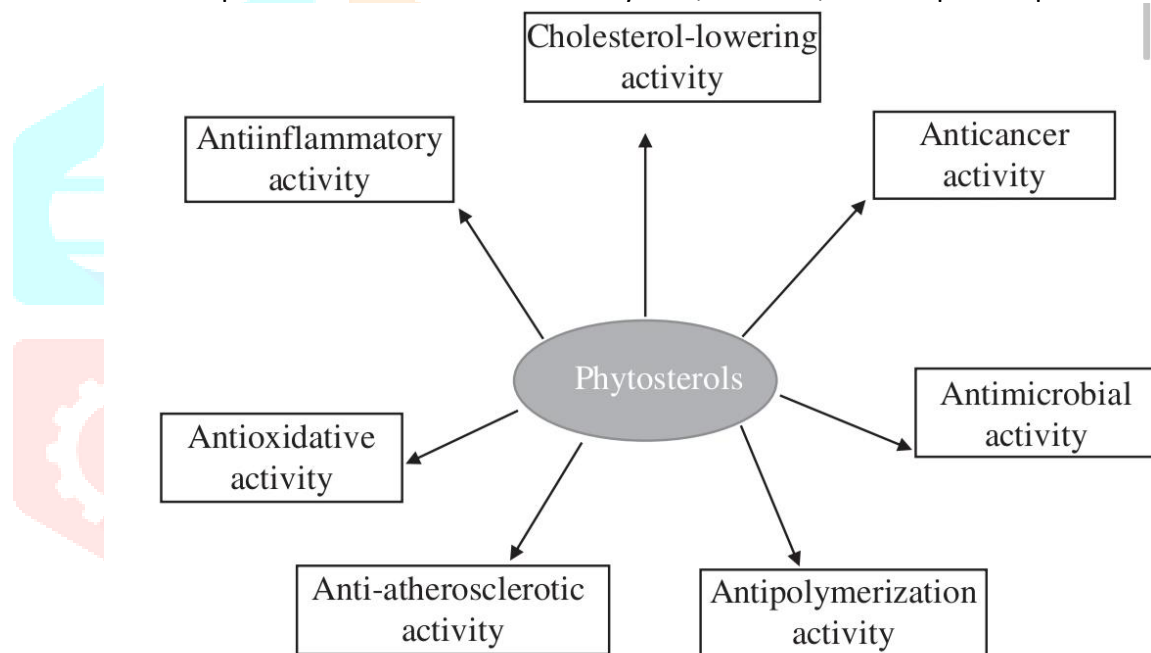
assessment, roots of *Ficus bengali*, and hair serum, phytosterols.



Fig: Banyan Tree

## I.Introduction:

In India, the banyan tree, or *Ficus Bengalese's* Linn, is revered as a sacred tree. Throughout India, from the sub-Himalayan region to the deciduous forests of the Deccan and South India, there are many different varieties of this big evergreen tree.(1) It is an evergreen tree that can reach a height of 30 metres and has branching branches and numerous aerial roots. *Ficus Bengalese* roots were subjected to preliminary phytochemical analysis, which found the presence of sugars, flavonoids, amino acids/proteins, steroids, saponins, and tannins 6, 13.(2) The bark leucopelargonidin-3-O-X-L rhamnoside, leucocynidin, 3-O-X-D galactosyl cellobioside, glucoside- $\beta$ -glucoside, 20-tetratria conthene-2-one, 6-hepatatria contene-10- one, pentatricentan -5-one,  $\beta$ -sitosterol-  $\alpha$  -Dglucose.(3) and (4) The root extract and chemical of the *Ficus Bengalese* are used to promote hair development and prevent hair loss. Techniques for generating the extracts and isolating the substances.An aerial root tip may be included in the aerial root part. A crude extract of the aerial root section of a *Ficus* plant, as well as the aerial root tip, is commonly prepared using this approach, and the crude extract is then fractionated using at least one solvent to produce different fractions. (5) There are numerous factors that can contribute to hair loss, including hereditary factors, hormonal changes, underlying illnesses, and head radiation therapy. Diet, along with hairstyles and treatments, is the main cause of hair loss. We created hair oil from banyan tree roots to help solve this issue. It is extremely safe, efficient, and simple to operate.



**Figure 1.Benefits of phytosterols for human health**

## Investigative needs:

Alopecia, or baldness, is another name for hair loss, which is the absence of hair on the head or other parts of the body. Alopecia aerate, telogen effluvium, and male- or female-pattern hair loss are among the common kinds. The majority of females who experience hair loss do so for a variety of reasons, including inadequate nutrition, hormone imbalances during pregnancy, bad diet, medications, environmental conditions, etc. Therefore, precautions must be taken, such as Consult your doctor if you are using any drugs or supplements that could be causing hair loss. Avoid exposing your hair to UV rays from the sun and other sources. (6)

Hair loss symptoms and signs include:

The top of the head gradually thins. As people get older, they are more likely to have this sort of hair loss.

Circular or patchy bald spots: Some persons have hair loss in the form of circular or patchy bald spots on their beard, eyebrows, or scalp.

Sudden loosening of the hair: A shock to the body or the mind can loosen the hair.

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Genealogy (family history). With ageing, a hereditary disorder is the most typical cause of hair loss. Androgenic alopecia, male-pattern baldness, and female-pattern baldness are the names for this disorder. Medical problems and changes in hormone levels. Permanent or temporary hair loss can result from a number of circumstances, including hormonal changes brought on by pregnancy, childbirth, menopause, and thyroid issues.

A highly stressful situation. Many people notice a general hair thinning several months after a traumatic physical or emotional event. Temporary hair loss results from this type.

Drugs and dietary supplements. Some medications, including those for cancer, arthritis, depression, heart issues, gout, and high blood pressure, can cause hair loss as a side effect.(7)

Diseases	Indralupta	Khalitya	Palitya	Darunak	Ecto parasite(BahyaKrimi)
Clinical features	Sudden loss of hair creating circular patch.	Gradual Hair loss leading to baldness.	Changes in normal black coloration of hair to grey, brown or whitish color.	Dry, Itchy and hard scalp condition.	Tiny insect infest the scalp.
Dosha Involvement	Vata and Pitta.	Pitta & Vata or Pitta & Kapha	Pitta.	kapha and vata  Sometimes Pitta and Rakta.	--
Sign & Symptoms	Vata Dominance - Pain  Pitta Dominance - Burning	Pitta Dominance - Sweating Kapha Dominance - Thickening of Skin.	In Vata association - Dry, rough skin and blackish grey colour.  Pitta Dominance - Brownish colour with burning sensation in scalp.  Kapha Dominance - White and shiny appearance.	Scalp becomes dry and drough leads to tiny cracks result into hair fall.	Itching, rash, blisters etc on Scalp, Visible lice on scalp.  These can also be seen on beard (smashru), body hair (loma), and in eyebrows (pakshma).

Figure 2. According to Ayurveda Types of hair disorders

Ingredient	Botanical Name	Part Use	Guna (Property)	Karma (Action)	Rasa (Taste)	Veerya (Potency)	Mode of Action
Vata Jata	Ficus bengalensis	Aerial Root	Guru, Ruksha	Shothahara Kapha pitta shamak	Kashaya	Sheeta	Anti-oxidant, Anti-microbial, Antifungal, Strengthens hair root

Figure 3. Properties of Banyan aerial roots

**Benefits:**

Before choosing a hair serum, it's crucial to understand its advantages. The following are the main advantages of a hair serum. (12-21)

**1) Multifunctional**

A hair serum treats multiple problems with the hair, not just one. It is dubbed a one-stop shop for all of your hair problems for a reason. A bad hair day can be improved by using hair serum. Your hair will feel and look different with just a few drops.

**2)Protects the hair**

Hair serum forms a layer on hair strands Therefore, it serves as a superb barrier against heat, sun damage, dirt, dust, and pollution. It keeps damage to your hair at bay. For this reason, applying a heat-protecting serum before using hot styling products is suggested.

**3)Makes the shiny**

Hair serum creates a layer that functions as a light reflector, giving your hair a shining, lustrous appearance. Amino acids included in hair serums shield coloured and chemically treated hair.

**4) Stops hair loss due to breakage**

We frequently lose a lot of hair strands when our hair gets tangled because of the effort required to untangle it. For such hair, hair serum functions as a lubricant and facilitates detangling. Less hair fall is the end consequence.

**5) Best for Dry Hair**

Those with dry, frizzy hair will benefit the most from hair serums. Hair serums smooth out and add shine to hair while locking in moisture.

**6) Conditions hair and improves manageability**

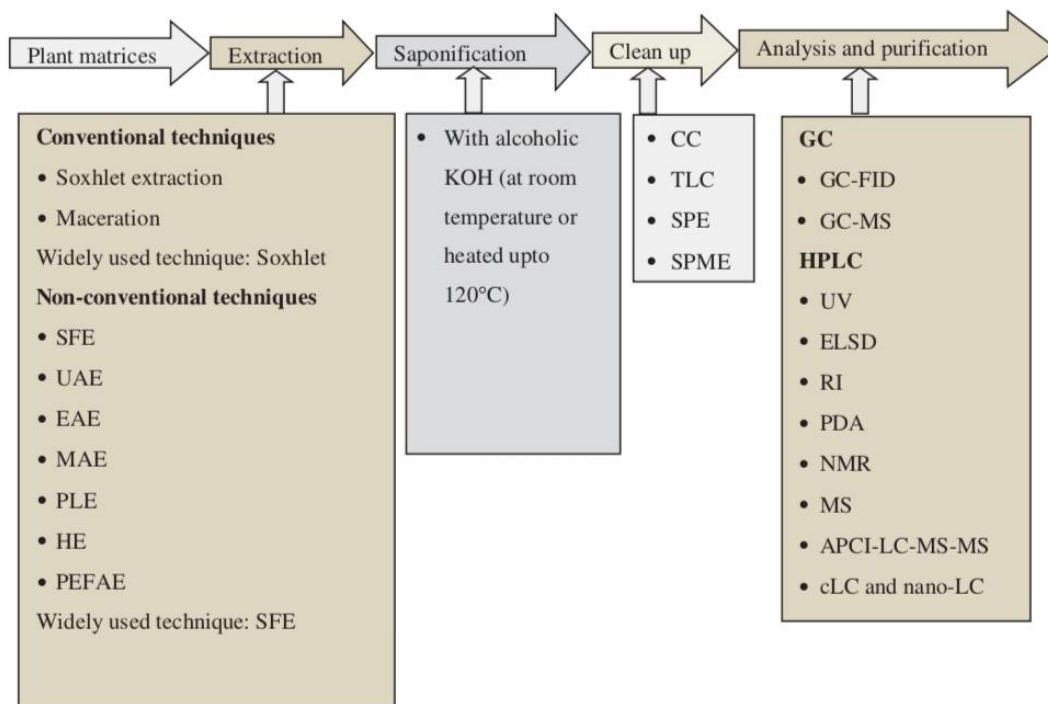
Hair serums restore brittle, damaged hair by filling in the follicular fissures. Hair serum makes hair easier to handle, which further facilitates styling. patience, effort, and time. The whole thing is kept.

**Extraction of phytosterols:**

The soluble plant metabolites can be separated using extraction procedures and a specific solvent. The kind of matrix and phytosterol form (free, esterified, and glycosylated) influence the phytosterol isolation procedures.[7] To get the right extract yield from the plant source, different conditions for each extraction method should be used.

The plant material, solvent, extraction method, and other elements all have a significant impact on an extract's quality.[18] To produce an extract with a high level of the desired component and excellent quality, all extraction-related factors must be optimised. There are both standard and unconventional extraction procedures, as was already mentioned.

The most typical goals of these procedures are to: (a) extract the desired bioactive component from plants.



**Figure 4: Methodologies for extraction and analysis of phytosterols**

Figure 4 depicts the procedure used for phytosterol extraction and analysis. The impact of different phytosterol extraction techniques, including Soxhlet, ultrasonic, supercritical carbon dioxide, and supercritical carbon dioxide with cosolvents, on cocoa butter was investigated by Roiaini et al. (54) The authors claimed that utilising supercritical carbon dioxide and a cosolvent, the maximum phytosterol content was attained. Abbas et al. created a method for extracting sterols from maize fibre using ethanol. (55) They contend that the forms of sitosterol, sitostanol, stigmasterol, campesterol, campestanol, spinasterol, phytosterol esters, phytostanol esters, and mixes of these are among the group from which the extracted phytosterols were chosen.

#### 1. Soxhlet extraction:

Soxhlet extraction is one of the more well-known conventional methods for removing different chemicals of interest from plant matrices. Although it was initially intended for lipid extraction, it is still used as a reference technique for assessing the performance of other conventional and non-traditional procedures. (22) Plant materials are put in a thimble holder and then placed in a distillation flask during the Soxhlet extraction process. The desired solvent is put into the distillation flask. The solution in the thimble holder is inhaled and syphoned back into the distillation flask when the solvent reaches the overflow level. The extract is introduced into the main liquid via the solution. The fresh solvent is added while the extracted solutes are maintained in the distillation flask, and the new solvent is returned to the plant material's thimble container. The extraction is carried out in this manner until it is finished.

The Soxhlet extraction technique should be used to extract the desired chemicals, and a suitable solvent should be selected. Due to the use of various extracting solvents, the yield and composition of the extract vary. The most popular solvents for extracting phytosterols include n-hexane, petroleum ether, ethanol, methylene chloride, and petroleum ether (22,23,24,). (25) Soxhlet extraction takes a long time and uses a lot of hazardous organic solvents for the environment and human health.



## 2.Maceration:

Maceration is a quick and low-cost method to extract phytosterols.(26)Both initial and bulk extraction can be done using this technique. The appropriate solvents are added to the ground-up plant materials in a container that is closed and kept at room temperature. The extraction process can be accelerated by stirring the solvent. When an equilibrium is reached between the solute concentrations in the extract and the plant material, compound extraction ceases. Following extraction, the liquid is decanted to remove the remaining plant matter (marc). The residual extract is extracted by pressing the marc. Filtration is used to get rid of contaminants from these liquid extracts. If the plant material is too tiny to be screened, centrifugation is frequently required. The marc is repeatedly extracted using to guarantee thorough extraction.Maceration is a laborious process that takes several hours to a few weeks to accomplish the extraction. At room temperature, it is ineffective to extract poorly soluble chemicals.

### Confirmatory tests of phytosterols:

#### 1.Solkowski test:

The plant extracts were used in the Solkowski test. taken in a test tube, 2 cc of the extract. Brown or red coloured ri was created by adding 2 ml of chloroform and 2 ml of concentrated sulfuric acid.(40)

#### 2.Libermann and Burchards test:

The test conducted by Libermann and Burchurd came following the extraction and reflux of the plant material. taken in a test tube, 2 cc of the extract. A confirmatory test was performed using 2 ml of chloroform, 2 ml of acetic anhydride, and 2 ml of concentrated sulfuric acid. The solution turned transparent green.(41)

### II.Material and Method:

Materials like ficus roots and solvents including n-hexane , petroleum ether,ethanol, methylene chloride,aluminium chloride, chloral hydrate, dichloromethane, ethyl acetate, toluene, and methanol are utilised in the manufacture of hair serum.

Plant matter: In and around the Institute of pharmaceutical science and research (For girls) campus in fresh aerial roots of Ficus Bengalese's Linn were gathered.

Also, Banyan tree arial roots powder, Aloe Vera gel, Rose water, Rosemary essential oil. (1)(2)



Figure 5.Aloe Vera



Figure 6. Rose water



Figure 7. Rosemary essential oil

### Preparing a powder extract. :-

To get the fresh aerial roots completely dry, they were baked at 60°C for 4-6 hours before being pulverised in an electric grinder. The resulting powder was put through sieve no. 60 and mounted in chloral hydrate and phloroglucinol solutions for microscopic inspection.(8,9) The % yield of all the extracts was calculated using approximately 40gm of powder and solvents such as petroleum ether (60-800 C), toluene, dichloromethane, ethyl acetate, methanol, and water, respectively. The purpose of this extraction is to identify the active ingredient in ficus root. Standard tests for alkaloids, flavonoids, phenolics, glycosides, and carbohydrates were used to analyse extracts. An extract that is high in ethyl acetate and contains more flavonoids is created.(3)(4)

### Preparation of hair serum:

Firstly, Take a powder extract,do the decoction process.Then,take 1 cup water in panand 1 teaspoon of powder extract, boil it until it becomes a concentrated for 2-3 spoon then, after boiling mix well and keep for rest.

First of all 1 tablespoon Aloe vera gel in bowl,add 1 tablespoon of rosewater (For fragrance and quite aromatic),add10 drops of rosemary essential oil (for no side effects ).

When your decoction process is left with 2-3 tablespoon or half cup after boiling, filter with a coffee strainer (it will more accurate) then ,add decoction to the mixture,whisk it properly. Store in a glass container now, hair serum is (ready.<https://youtu.be/Nqp0eLzg9qM?si=enitwphu9ahbbLTE>)

### III.Evaluation test:

1. Physical Appearance: The texture, colour, and fragrance of the cosmetic serum formulation were observed and used to assess physical appearance.

2. pH:7

Using a digital pH metre, the pH test will be determined.

The pH value will be recorded after a deep immersion of the digital pH dipper into the sample of serum formulation. Since the skin has an acidic pH of about 4-6, the formulation's pH should be acidic.

3. Homogeneity Test: The hair serum was applied to a dry, clean object glass, which was then covered. Investigated was the appearance in the presence of certain coarse particles or homogeneity. Herbal hair serum underwent a visual inspection to check for homogeneity and any lumps, flocculates, or aggregates.8

4.Viscosity: 9

Using 4.5 ml of the serum and a spindle type model S6 at 100 rpm, the viscosity of the formulation is measured. Before the measurement, the spindle will be immersed in the serum for around 5 minutes in a large mouth container.

5. Spreadability Test: The spreadability of semisolid preparations was evaluated using a parallel plate technique, which is generally employed to do so. A gramme of hair serum was compressed between two 20 by 20 cm horizontal plates, the upper of which weighed 125 g. After one minute, the spread diameter was measured. In order to determine spreadability, the following formula was used:

$$S = M \times L / T$$

Where S is the spreadability, M is the weight of the pan (attached to the higher slide), L is the distance travelled by the glass slide, and T is the time (in seconds) needed to completely separate the slides 10

6. Stability Test: The herbal hair serum was stored for three months at 65% RH at two different temperatures of 4°C and 30°C. After three months, the pH and viscosity of the herbal hair serum were measured and compared to their initial values.(12-15)

### IV.Conclusion:

This hair serum offers the nutrients needed for healthy hair development. This serum has several positive effects on both preventing hair loss and encouraging hair growth. Regular use of this serum for at least six months yields positive results. The specially prepared hair serum will assist in preserving healthy hair development in addition to providing services such as changing grey hair into black, dandruff protection, stress reduction, etc. The pH, viscosity, acid value, and other criteria were used to manufacture and analyse this serum. This herbal serum has notable quality all around.



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