

Formulation and Evaluation of Herbal Shampoo Powder

B. Rahul, B.Vigneshwar, B.Manogna, B.Deepika, C.Sriram,

Malla Reddy College of Pharmacy, Secunderabad-500100(T.S)

Corresponding author: Manga Kanukuntla M.Pharm

Department of Pharmaceutics

Date of Submission: 05-02-2025

Date of Acceptance: 15-02-2025

ABSTRACT: In essence, a shampoo is a detergent solution enhanced with the right components for extra benefits including better lubrication, medication, and hair conditioning. Since consumers believe natural products are risk-free and have no negative effects, herbal shampoo is growing in popularity among the many various kinds of shampoos available on the market today, including synthetic, herbal, medicated, and non-medicated variants. The present study is to formulate herbal shampoo, compare and evaluate the physicochemical properties with the commercially available shampoos.

Shampoo was formulated by adding the extracts of *Calendula officinalis*, *Lawsonia inermis*, *Citrus limonum*, *Citrus ulgaric*, and *Santolina trifoliatus* such as physical appearance/visual inspection, pH, solid contents, foam test, viscosity test, dirt dispersion test, surface tension, wetting test, and conditioning performance tests were performed to determine the physicochemical properties of formulated herbal shampoo and commercial shampoos. The formulated herbal shampoo and commercial shampoo were also evaluated for conditioning performance by blind test on twenty volunteers.

I. INTRODUCTION:

Shampoos are probably the most common product we use on a daily basis to clean our hair and scalp. In essence, a shampoo is a detergent solution with the right additives for extra benefits like better hair conditioning, lubrication, and medication. There are many different kinds of shampoos on the market today, including synthetic, herbal, medicated, and non-medicated varieties. However, consumers are increasingly interested in herbal shampoo because they believe that because these products come from natural sources, they are risk-free and have no negative side effects.

Synthetic shampoos use synthetic surfactants primarily for their washing and foaming properties, however long-term use of these surfactants can cause dry hair, eye and scalp

irritation, and hair loss. Instead of using synthetic shampoo, we have natural herbal shampoos. The production of cosmetics using only natural materials is quite difficult, though. Shampoo formulas all over the world have been using a variety of medicinal plants that may be good for hair for ages. Extracts, powders, crude forms, and derivatives are all possible uses for these medicinal herbs. Making a shampoo with just one natural component that is gentler and safer than synthetic shampoo is difficult. It must also have a lot of foaming, detergency, and solid matter, just like synthetic shampoo.

Hair Health and Common Issues

Importance of Hair Health Hair health is a significant aspect of overall personal health and well-being. Healthy hair is often associated with good nutrition, proper hygiene, and effective hair care practices. It plays a vital role in an individual's appearance and self-esteem, impacting social interactions and personal confidence. Maintaining hair health involves regular care to prevent damage and promote strength and shine.

Common Hair Problems

Despite the importance of hair health, many people face a variety of hair-related issues. Some of the most prevalent problems include:

i. Hair Loss: Hair loss or alopecia is a common concern affecting both men and women. It can be caused by genetic factors, hormonal changes, nutritional deficiencies, and stress. The psychological impact of hair loss can be profound, leading to decreased self-esteem and emotional distress.

ii. Dandruff: Dandruff is characterized by flaking of the scalp and can be accompanied by itching and irritation. It is often caused by a fungal infection, dry skin, or sensitivity to hair care products.

iii. Dry and Damaged Hair: Hair can become dry and damaged due to environmental factors (like sun exposure and pollution), excessive use of heat

styling tools, chemical treatments, and improper hair care routines. This can lead to split ends, breakage, and a lack luster appearance.

iv. Scalp Issues: Conditions such as seborrheic dermatitis, psoriasis, and scalp acne can affect the scalp's health, leading to discomfort and impacting hair growth.

As a result, we gave careful thought to developing a pure natural cleanser employing a time-tested method and commonly used plant material for washing hair. (1)

DEFINITION:

HERBAL SHAMPOOS are the cosmetic preparations that with the use of traditional ayurvedic herbs are meant for cleaning the hair and scalp just like the regular shampoo. They used for removal of oils, dandruff, dirt, environment pollution.

Hairs are the integral part of human beauty. People are using herbs for cleaning, beautifying and managing hair since the ancient era. Whereas the hair has been trimmed, shaped and even colored since the most ancient times, relatively little emphasis has been placed on the process of cleaning it. Only in this century has a real technology in the cleaning of the hair and scalp been developed. First came the mass distribution of cake soap and sanitary facilities to make bodily cleanliness and personal hygiene practice. Next came the specialization of branded shampoo products for the hair and scalp, offered in multiplicity of types and forms. Now, washing the hair and scalp with shampoo has become a nearly universal practice. Shampoos are probably the most widely used hair products today, based on synthetic ingredients as well as herbal ingredients. Shampoos are of various types, like powder shampoo, clear liquid shampoo liquid shampoo, lotion shampoo, solid gel shampoo, medicated shampoo, liquid herbal shampoo etc. Dandruff is known to be controlled by fungi static ingredients in Anti-dandruff shampoos. Herbal formulation has growing demand in the world market. The natural remedies are more acceptable in market because it's safe and fewer side effect antidandruff shampoo and nutritional shampoo containing vitamin, amino acids proteins hydrolysate. Currently available treatment of dandruff includes therapeutic use of zinc pyrithione, salicylic acid, imidazole derivatives, glycolic acid, steroids, and Sulphur and coal tar derivatives. However, these agents show certain

limitations, either due to poor clinical efficacy or due to the. Furthermore, compliance issues, these drugs are unable to prevent recurrence. The synthetic shampoo contains cationic, anionic and non-anionic surfactant mix in this surfactant having good foaming character but its toxic and caused irritation of eye. Hard water the surfactants leave a deposit of sodium, calcium and magnesium salts on the hair shaft. So, these synthetic shampoos are found to have side effects like drying effect on the hair. These shampoos leave the hair too dry to handle (or) comb, to avoid these problems, herbal shampoos will be useful. (2)

Three formulations had been prepared for the herbal dry shampoo powder

All formulations have the following ingredients:

SHIKAKAI (acacia concinna):

FAMILY: fabaceae

PARTS USED: leaves and pods

Biological source:

It is a dried gummy exudation of stem and branches of Acacia Arabica.

USES

- >Make hair clean. Give the hair more shine prevent grays.
- >Crubs hair loss.
- >soothes the scalp
- >fights dandruff.
- >nourishes hair follicles

Shikakai is also known as the "fruits of hair," and is commonly found in Asia it acts as a natural cleanser and detangler for hair. Shikakai has low ph and possesses various beneficial properties, including anti-inflammatory, anti-fungal, anti-bacterial, and anti-oxidant effects.

It provides a cooling sensations when used. Remarkably, shikakai is considered safe for daily use without causing any side effects. The pods of shikakai contains saponins, including acacia acid and natural surfactants, which contribute to its cleansing properties for hair. (3)



Figure 2: Figure of shikakai

REETHA (*Sapindus mukorossi*)

FAMILY: Sapindaceae

PARTS USED: dried fruit nut from soap nut tree.

Biological source: Dried fruits of *sapindus mukorossi*.

Sapindus mukorossi, commonly known as Indian soapberry, wash nut, reetha or Chinese soapberry. It is a deciduous tree that grows in the lower foothills and midhills of Himalayas at altitudes of up to 1,200 meters.

Reetha, also known as *Sapindus mukorossi*, contains saponins, sugars, mucilage, flavonoids, phenolic acids, and fatty acids.

Saponins

- A large family of compounds that are secondary plant metabolites
- A major constituent of reetha fruit, making up about 10–11.5% of its mass
- A mixture of six sapindosides, including sapindoside B
- Can be extracted from reetha fruit using chemical extraction methods
- Used in India to make natural hair cleansers

Uses & Benefits of Reetha

- Reetha is used as the main ingredient in soaps and shampoos for washing hair, as it is considered good for the health of hair.
- The jewelers in India use this plant to bring back the lost brightness of ornaments made of precious metals like gold, silver, etc.
- The herb is also used in the treatment of extra salivation, migraine, epilepsy and chlorosis.
- It has been placed as a popular herb in the list of herbs and minerals in Ayurveda and is used as an important ingredient in cleansers and shampoos.

- It is used for the treatment of eczema, psoriasis, and for removing freckles.
- It is also used for removing lice from the scalp, as it has gentle insecticidal properties
- The plant is known for its antimicrobial properties that are beneficial for septic systems (4)



Figure 3: Figure of reetha

AMLA(*phyllanthusemblica*)

FAMILY: euphorbiaceae

PARTS USED: fruit

Biological source: it is a fruit of *Phyllanthus emblica* tree which is native to India

The tree is also known as Indian gooseberry tree

Uses of amla:

- Nourishes hair
- Strengthens hair follicles
- Controls dandruff
- Prevent hair fall
- Adds natural shine to hair
- Promote hair growth
- Prevent grey hair
- Boost hair volume
- Conditions hair
- Treats head lice
- Prevent hair dryness
- Cleanses scalp
- Prevent dull and damaged hair



Figure 4: Figure of amla

Amla is an ingredient which helps to prevent gray hair and it is a medicine to improve hair health it is rich in vitamins and minerals, antioxidants. It also stimulates hair growth owing to its high iron. The study on amla demonstrated that amla syrup could help treat androgenic hair loss in women and increases the anagen phase. (5)

Tea (Camellia sinensis)

FAMILY: theaceae

PARTS USED: leaves

Biological source: leaf buds of camellia sinensis plant essentially the leaves are harvested and processed to create the tea powder.

USES

- It is used in hair care.
- enhance hair color
- support hair growth
- promotes shiny hair.
- It stimulates hair follicles

Black tea is not only a delicious drink but also a popular hair care treatment.

Yet, only limited evidence suggests that applying black tea to your hair and scalp may improve hair color, shine, and hair growth, so more research is needed. It may work best on dark hair.

It is having anti-inflammatory properties which soothes the scalp, reducing inflammations and alleviating conditions such as dandruff and scalp irritation. (6)



Figure 5: Figure of tea

HENNA (lawsonia inermis)

FAMILY: Lythraceae

PARTS USED: dried leaves of henna into powder form

Biological source: Henna

(Lawsoniainermis) is a shrub or small tree that is the biological source of henna. It is native to the dry, coastal scrublands of North Africa, the Middle East, and parts of southern Asia.

It reacts with the keratin in skin and hair and producing a red or orange stain.

USES

- Improve hair color
- Improve scalp health
- It contains anti-fungal properties which remove dandruff
- Increase hair health
- Its softness hair because it contains vitamin E and tannins.

Henna is one of the hair care ingredients that Indians have shared with the rest of the world. Indian women have been using henna for years, if not centuries, to care for their luscious locks. If you are allergic to chemical dyes and want to get rid of grey hair naturally, henna should be your go-to ingredient.

- It is loaded with tannins, a plant compound that is responsible for the rich colouring of tea. But you will discover multiple benefits of henna beyond dying.
- It improves hair condition, conditions your hair, balancing oil and ph. production,
- Get rid of oxidative stress
- Protects hair color. (7)



Figure 6: Figure of henna



Figure 6: Figure of bhringaraj

BHRINGARAJ (*eclipta prostrata*)

FAMILY: Asteraceae

PARTS USED: leaves, flowers, roots, and stem

- Biological source:
- Bhringraj is a weed that grows in moist places, such as wastelands, hedges, roadsides, and paddy fields.
- It is found in tropical and subtropical regions of Asia, Africa, and South America.
- Bhringraj is also known as false daisy, karisilakanni, bhumiraj etc.

USES

- Fights against Hair loss
- Controls premature greying hair. It has an ability to rejuvenate hair due to its resaying properties.
- Promoting thicker denser hair.
- Strengthens root for healthier hair.
- Preserve natural color with melanin-boosting properties.
- Revitalizes dull hair, leaving it shiny and full of life.

White hair generally occurs due to imbalance of kapha dosha. Bhringraj applied to the hair manages white hair due to kapha balancing and keshya (hair tonic) properties. That helps to maintain good quality of hair. (8)

FENUGREEK (*Trigonella foenum-graecum*)

FAMILY: leguminosae

PARTS USED: seeds of fenugreek

Biological source: dried seeds of *Trigonella foenum*

USES:

- It is a natural home remedy for thinning of hair and other hair problems like dandruff or dry itchy scalp.
- Anti-inflammatory
- Moisturizing
- Antifungal
- Skin soothing
- Helps in maintaining a healthy scalp
- Used as a supplement for hair loss

Fenugreek seeds are rich of proteins and nicotinic acid, promoting hair growth by strengthening hair follicles. Many studies show that methi seeds help prolong hair growth and also prolonger and thicker hair strands. Fenugreek contains lecithin which strengthens hair roots and prevents hair loss. Additionally, methi seeds have been found to hinder the activity of 5-alpha reductase, enzyme linked with loss and help maintain hair density and reduce hair fall. (9)



Figure 7: figure of fenugreek

HIBISCUS FLOWER: (rosa-sinensis)

FAMILY: malvaceae

PARTS USED: flower petals which are dried and powdered

Biological source: it is a species of herbs, shrubs and trees in the mallow family that are native to warm temperature and topical regions.

it contains flavonoids, anthocyanins, tannis, and phenolic acids

Flavonoids improve the scalp health by reducing inflammation

Anthocyanins help in protecting hair follicles

Vitamins A, E, C also found in hibiscus flower

USES

- It promotes hair growth and reduce dandruff and conditions hair
- Using hibiscus flower powder provides good and healthy hair.
- It adds shine and luster
- Deep condition to hair

Hibiscus tea is packed with essential vitamins and minerals that nourish hair follicles. By providing the necessary nutrients, it helps maintain healthy hair growth and the high vitamin C content in **hibiscus flowers benefits** by aiding collagen production, which is vital for maintaining the natural color of your hair. Hibiscus can prevent premature graying by retaining the hair's natural pigments. Prevents the hair follicles from becoming dormant. Prevent pre mature graying (10).



Figure 8: figure of hibiscus

NEEM:(azadirachta indica)

FAMILY: meliaceae

PARTS USED: neem leaves dried and powdered

BIOLOGICAL SOURCE:

The biological source of neem is azadirachta indica tree, which is native to India and other topical countries.

USES:

- Prevent dandruff and itchy scalp
- Promote hair growth
- Hydrations for damaged hair ends
- Saves from premature hair
- Soothe frizz
- Minimize grays

Hair loss can be effectively treated with the herb neem, which is well-known for its medicinal properties. Neem is good to get rid of dandruff because of its antibacterial and anti-inflammatory characteristics. Neem strengthens the hair follicles and aids in the growth of hair development.

Neem leaves contain various fatty acids content which is used to cure scalp problems in various ways. Neem leaves contain a best hair enriching properties so hair gets stronger.

The neem penetrates deep into the hair follicles and improve density of the hair. (11)



Figure 9: figure of neem

BRAHMI (bacopa monnieri)
 FAMILY: plantaginaceae
 PARTS USED: dried leaves and stems of Brahmi
 BIOLOGICAL SOURCE: dried leaves of centlla asiatica
 It contains triterpenoids have jujubogenin, which promotes hair growth and maintain scalp health.

USES:

- It strengthens hair
- Reduces hair loss
- Prevents split ends
- Clams inflammation on the scalp
- Adds volume to hair

Brahmi which is mostly known as brain booster and anti-oxidant also addresses hair repairing properties. The plant and its white flowers contains therapeutic properties. The Brahmi's soothing properties help improve the brain cognitive functions enhances good sleep at night. (12)



Figure 10: figure of Brahmi

MATERIALS REQUIRED

Equipment's required:

- Mixing Grinder
- Weighing balance
- Sieves
- PH meter
- Bulk density apparatus
- Tapped density apparatus

INGREDIENTS	USES
Shika kai	Hair growth
Reetha	Manage dandruff
Amla	Cover grey hair
Tea	Add shine
Henna	Colour hair and strengthen hair
Bhring raj	Prevent hair irritations
Fenugreek	Prevent hair loss
Hibiscus flower	Hair conditioning
Neem	Prevent scalp dryness
Brahmi	Natural hair conditioner

In preparation of herbal shampoo powder, we prepared 3 formulations

FORMULATION 1

INGREDIENTS	F1
Shikakai	15gm
Reetha	15gm
Amla	10gm
Tea	5gm
Henna	15gm
Bhring raj	5gm
Fenugreek	5gm
Hibiscus flower	15gm
Neem	10gm

Brahmi	5gm
--------	-----

FORMULATION 2

INGREDIENTS	F2
Shikakai	15gm
Reetha	5gm
Amla	10gm
Tea	10gm
Henna	10gm
Bhring raj	10gm
Fenugreek	5gm
Hibiscus flower	15gm
Neem	15gm
Brahmi	5gm

FORMULATION 3

INGREDIENTS	F3
Shikakai	10gm
Reetha	10gm
Amla	10gm
Tea	5gm
Henna	20gm
Bhring raj	10gm
Fenugreek	5gm
Hibiscus flower	10gm
Neem	5gm
brahmi	5gm

PROCEDURE:

Drying: Every powder has been ground and is in a dry state.
 Size reduction: After the raw materials were gathered, each one was size reduced using a

powered mixer.
 Sieving: To obtain an adequate amount of fine powder, this fine powder was next run through sieve number 80.
 Weighing: Each of the necessary herbal powders for making shampoo was separately
 Mixing: To create a uniformly fine powder, all of these fine materials were thoroughly combined using a mixer.
 Packing and Labeling: After that, it was appropriately packed and labeled.

Evaluation test:

Powder characteristic:

Particle size the configuration of sieves with progressively smaller apertures.
 Particles are allowed to fall through the sieve by shaking the sample while it is on top of it.
 Each sieve's material content is weighed and expressed as a percentage.
 Herbal shampoo powder's particle size can vary, however some examples are 20–25 or 20–23 μm.
 This parameter affects qualities like giftiness and spreadability.

Angle of repose:

The funnel method

It is the greatest angle that can exist between the powder pile's surface and the horizontal flow. A funnel set six centimeters above a horizontal base holds the necessary grade of dried powder. On the horizontal plane, the powder was allowed to accumulate in a heap on top of the paper. After noting and recording the powder's height and radius, the formula can be used to determine the angle of repose (θ).

$$\theta = \tan^{-1}(h / r)$$

Where, θ – Angle of repose,

h – Height of the heap,

r – Radius of the base

Bulk density

The ratio of a powder's specified mass to its bulk volume is known as its bulk density. After drying, the necessary quantity of powder is added to a 50 ml measuring cylinder until it reaches the 50 ml mark. The cylinder is then dropped at two-second intervals from a height of one inch onto a hard wood surface. The powder's volume is measured. The powder is then weighed. To obtain average results, this process is repeated. The following formula is used to determine the bulk density.

$$\text{Bulk Density} = \frac{\text{Mass of the herbal powder shampoo}}{\text{Volume of the herbal powder shampoo}}$$

Tapped density:

When a container holding the powder sample is mechanically tapped, an enhanced bulk density known as the "tapped density" is achieved. Following the observation of the initial powder mass or volume, the measuring cylinder or vessel is mechanically tapped for one minute, and readings of the mass or volume are taken until there is little more change in either. The unit of measurement was grams per cubic centimeter (g/cm³).

Hausner's ratio:

The ease of flow of a powder is measured by the Hausner's ratio (HR). The tapped density of the powder is divided by the bulk density to determine it.

Steps to take:

Quantify the powder's unsettled volume.

To stop the powder from changing volume, tap it.

Find the powder's final tapped volume.

Utilizing the formula, determine the Hausner ratio.

HR=

PHYSICOCHEMICAL EVALUATIONS

Ph

At room temperature (25°C), the pH of a 10% shampoo solution in distilled water was measured.

A digital pH meter was used to measure the pH.

Washability

Following the application of formulations to the skin, the degree and simplicity of water washing were personally assessed.

Solubility

The ability of a substance to dissolve in a solvent is known as solubility. After precisely weighing one gram of the powder, it is added to a beaker with 100 milliliters of water. To improve the solubility, this was thoroughly agitated and then heated. After cooling and filtering, the residue is measured and recorded.

Ash value:

1. Weigh a dry, clean crucible.
2. Weigh a material sample before adding it to the crucible.
3. Raise the sample's temperature in a furnace to a high level, such 500–600°C, until it turn white.

4. Place the crucible in a desiccator to cool it.
5. Weigh the ash and crucible.
6. Determine the ash percentage.

Formula for calculating ash value

$$(\text{ashed weight} - \text{crucible weight}) \times 100$$

Percentage of ash=

$$\frac{(\text{Crucible and sample weight} - \text{crucible weight})}{\text{Crucible and sample weight}} \times 100$$

Moisture content:

In a tare evaporating dish, 10 g of each herbal shampoo powder was weighed and stored at 105°C in a hot air oven. Drying was repeated until, after a 30-minute break, a consistent weight decrease was noted. Each sample's moisture content was determined.

Foaming index:

After precisely weighing one gram of the powder, it was put into a 250 ml conical flask with 100 ml of boiling water. After 30 minutes of gentle warming, it is cooled, filtered, and then added to a standard volumetric flask to reach a volume of 100 ml. Ten test tubes are filled with this extract in successive portions of 1, 2, 3,..., 10 ml. The remaining volume is filled with water to equal 10 ml. After that, the test tubes were shaken for 15 seconds at a speed of two frequencies per second in a longwise motion. After that, the tubes are let to stand for fifteen minutes. The foam's height was measured.

Foaming index = 1000/a

Nature of the hair after wash:

Hair is washed with the herbal powder and observed the nature of the hair.

	F1	F2	F3
Angle of repose	49.1	48	52
Particle size	20-23	30-32	35.37
Bulk density	0.692	0.56	0.78
Tapped density	0.494	0.41	0.52
Hausner's ratio	0.75	0.80	0.79

II. RESULT AND CONCLUSION: POWDER CHARACTERISTICS

DISCUSSION:

- F1 and F2 has the lowest angle of repose indicating the best flow properties and F3 also follow closely.
- F1 has the low particle size and also 20-23 is considered as a standard particle size.
- F1 shows the highest bulk density suggesting better flow properties and more efficient space utilization compared to F1 and F2.
- F1 has the lowest Hausner’s ratio indicating the best flow properties

PHYSICOCHEMICAL CHARACTERISTICS

	F1	F2	F3
Ph	4.74	4.5	5.2
Solubility	0.51	0.48	0.54
Ash value	0.23/2g m	0.23/ 2gm	0.23/ 2gm
Moisture content	9.30/10g m	8.8/1 0gm	7.2

DISCUSSION:

- The F1, F2 and F3 showing neural level of ph.
- All the formulations showing good solubility and ash value.
- Moisture content is good in the F1 formulation compared to other formulations

ORGANOLEPTIC EVALUATIONS:

An evaluation of an herbal shampoo powder ‘s organoleptic properties is shown in Table. The preparation was a brownish tint. The aroma of the finished formulations had a distinct flavor that is appealing for cosmetic preparations, and the texture and appearance fulfilled the standards for cosmetic preparations.

	F1	F2	F3
Colour	brown	brown	Brown
Odour	Slight pleasant	Slight pleasant	slight
Texture	Fine smooth	Fine smooth	Fine smooth
taste	Characteristic	Characteristic	Characteristic

Foaming capacity:

Stable and persistent foam is observed, it indicates the presence of saponins

F1

Sl.no	Time interval	liquid	foam
1.	0min	50ml	3.5
2.	5min	50ml	3
3.	10min	50ml	2.5

F2

Sl.no	Time interval	Liquid	foam
1.	0min	50ml	3
2.	5min	50ml	2
3.	10min	50ml	1

F3

Sl.no	Time interval	Liquid	foam
1.	0min	50ml	3
2.	5min	50ml	2.5
3.	10min	50ml	2

Among all the formulations F1 is considered as a best formulation because it is showing best results for all the tests

Nature of the hair after wash: the volunteer used the F1 formulation and stated that hair was smooth and shiny after 3 weeks of usage.

III. CONCLUSION:

In conclusion, the development and testing of the powder-based herbal shampoo powder, in summary, marks a substantial breakthrough in natural hair care and provides a competitive substitute for manufactured goods. This research offers insightful information about how to combine traditional

knowledge supported by contemporary science, meeting the changing needs of ethical customers looking for sustainable, safe, and efficient hair care products.

REFERENCES:

[1]. Telrandhe, et al.: comparative evaluation of lab based herbal shampoo with commercially available shampoos.

[2]. Mulani et al. / International Journal of Pharmaceutical Chemistry and Analysis 2021;8(3):112–117 formulation of herbal dry shampoo.

[3]. Tiwari, R. (2012). Acacia concinna: A natural surfactant for healthy hair and skin. International Journal of Research in Ayurveda and Pharmacy, 3(2), 223-228.

[4]. Jain, P., Bansal, D., & Bhasin, P. (2014). Hair cosmetics: An overview. International Journal of Trichology, 6(1), 31.

[5]. Goyal, R. K., & Singh, J. (2005). Review of medicinal plants used in the treatment of hair disorders. Phytotherapy Research, 19(7), 556-563.

[6]. Koch W, Zagórska J, Marzec Z, Kukula-Koch W. Applications of Tea (*Camellia*

sinensis) and its Active Constituents in Cosmetics. *Molecules*. 2019 Nov 24;24(23):4277. doi: 10.3390/molecules24234277. PMID: 31771249; PMCID: PMC6930595.

[7]. Medically reviewed by Cynthia Cobb, DNP, APRN, WHNP-BC, FAANP — Written by Shirin Mehrotra on March 23, 2021 henna benefits for hair

[8]. Hindawi Publishing Corporation International Scholarly Research Notices Volume 2014, Article ID 385969, 22 pages <http://dx.doi.org/10.1155/2014/385969> Review Article Ethnopharmacological Significance of *Eclipta alba* (L.) Hassk. (Asteraceae) bhringaraj

[9]. Fenugreek Leaf Extract and Its Gel Formulation Show Activity Against *Malassezia furfur* Madhur Kulkarni,1 Vishakha Hastak,1 Vitthal Jadhav,1 and Abhijit A. Date2 1Department of Pharmaceutics, SCES's Indira College of Pharmacy, Tathawade, Pune, India. 2Department of Pharmaceutical Sciences, The Daniel K. Inouye College of Pharmacy, University of Hawaii at Hilo, Hilo, Hawaii

[10]. Al-Snafi, Ali. (2018). Chemical constituents, pharmacological effects and therapeutic importance of *Hibiscus rosa-sinensis*- A review. 8. 101-119.

[11]. Alzohairy MA. Therapeutics Role of *Azadirachta indica* (Neem) and Their Active Constituents in Diseases Prevention and Treatment. *Evid Based Complement Alternat Med*. 2016;2016:7382506. doi: 10.1155/2016/7382506. Epub 2016 Mar 1. PMID: 27034694; PMCID: PMC4791507.

[12]. Tamboli, Firoj & Tarlekar, Shreyash & Jadhav, Rajendra & Alaskar, Kamal &



- Desai, Vaibhava & Kanthe, Rajesh.
(2022). Brahmi (Bacopa monnieri): an
ayurvedic herb in the management of
various diseases. 10. 59-74.
- [13]. 2023 IJCRT | Volume 11, Issue 6 June
2023 | ISSN: 2320-2882 formulation and
evaluation of dry herbal shampoo powder