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Formulation And Evaluation of Anti-Fungal Herbal Shampoo

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ABSTRACT

The present study focuses on the development and evaluation of a natural herbal shampoo formulation using five wellknown plant-based ingredients like amla (Emblica officinalis), ritha (Sapindusmukorossi), shikakai (Acacia concinna), neem (Azadirachta indica) and aloe vera (Aloe barbadensis). These ingredients were chosen based on their traditional use and scientifically established benefits in hair care, including cleansing, conditioning, antimicrobial action, and scalp nourishment. The objective was to create a shampoo that not only cleanses the hair and scalp effectively but also supports hair growth, reduces dandruff, prevents dryness, and enhances hair texture without the use of synthetic surfactants, or artificial fragrances. The herbal shampoo was prepared using aqueous extraction and cold blending techniques to retain the bioactivity of all components. It was then subjected to extensive physicochemical and biological evaluation, including tests for pH, foam stability, surface tension, dirt dispersion, solid content, detergency, and microbial inhibition. The results demonstrated that the shampoo had a near-neutral pH, good foaming capacity, effective dirt. The formulation of herbal shampoo indicates a safe, eco-friendly, and effective. It also aligns with the increasing consumer demand for natural and sustainable personal care products.

Keywords: Herbal shampoo, Amla, Ritha, Shikakai, Aloe vera, Anti-Fungal

I. INTRODUCTION

Herbals

The use of herbal implies substantial historical use, and this is certainly true for many products that are available as ‘traditional herbal medicines’. In many developing countries, a large proportion of the population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs. Although modern medicine may exist side-by-side with such traditional practice, herbal medicines have often maintained their popularity for historical and cultural reasons. Such products have become more widely available commercially, especially in developed countries. In this modern setting, ingredients are sometimes marketed for uses that were never contemplated in the traditional healing systems from which they emerged. An example is the use of ephedra (= Ma huang) for weight loss or athletic performance enhancement (Shaw, 1998). While in some countries, herbal medicines are subject to rigorous manufacturing standards, this is not so everywhere. In Germany, for example, where herbal products are sold as ‘phytomedicines’, they are subject to the same criteria for efficacy, safety and quality as are other drug products. In the USA, by contrast, most herbal products in the marketplace are marketed and regulated as dietary supplements, a product category that does not require pre-approval of products on the basis of any of these criteria**.**

Shampoo

Hair-care products may be defined as the preparation which is meant for cleansing, modifying the texture, changing of the color, giving life to the stressed hair, providing nourishment to the hair and giving the healthy look to the hair. The word revitalize truly symbolizes the term what is routinely called as renourish or conditioning. The real technology of cleaning the hair and scalp was developed in this century by the introduction of cake soap which was followed by the production of shampoo products.

The shampoo is a word derived from Hindi champo which means head massage with some form of hair oil.A shampoo is a preparation containing a surfactant (i.e. Surface active material) in a suitable form – liquid, solid or powder – which

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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. They are expected to be nonirritating to skin and mucous membranes. Shampoos are liquid, creamy or gel like preparations.

Herbal Shampoo

Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning scalp and hair in our daily life. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives, preservatives and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The purpose of using shampoo is to remove dirt that is build up on the hair without stripping out much of the sebum. Many synthetic shampoos are present in the current market both medicated and non-medicated, however, herbal shampoo popularized due to natural. origin which is safer, increases consumer demand and free from side effects. In synthetic shampoos, surfactants (synthetic) are added mainly for their cleansing and foaming property, but the continuous use of these surfactants leads to serious effects such as eye irritation, scalp irritation, loss of hair, and dryness of hairs. Alternative to synthetic shampoo we can use shampoos containing natural herbals. However, formulating cosmetic products containing only natural substances are very difficult. There are a number of medicinal plants with potential effects on hair used traditionally over years around the world and are incorporated in shampoo formulation These medicinal plants may be used in extracts form, their powdered form, crude form, or their derivatives. To develop a shampoo containing an only one natural substance which would be safer with milder effect, then the synthetic shampoo is difficult and also it should possess good foaming, detergency, and solid content as such synthetic shampoo. Hence, we considered in detailing an unadulterated natural cleanser utilizing conventional technique using regularly utilized plant material for hair washing.

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 non medicated 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. Synthetic surfactants are added to shampoo primarily for the foaming and cleansing action but their regular use leads to dryness of hairs, hair loss, irritation to scalp and eyes 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. 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 and gulf region especially.

The Greek word cosmetics, meaning “cosmesis” or “beautifying substance,” is where the word cosmetic originates. Chemicals called cosmetics are applied to the human body to improve its look. Both developed and developing nations have high demand for cosmetics, which 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, varieties of butter, and many other products. The global market for herbal cosmetics is expanding, and these products are a priceless gift from nature. You can fulfill your beauty regimen with a variety of herbal cosmetic products, and using herbal cosmetics is extremely safe for your skin and hair. The use of natural resources, including plants, has decreased with the advancement of science and technology, with the exception of food; vegetarians consume only plants. Humans have long used herbs for a variety of purposes, including food, medicine, and beatification. Nonetheless, the use of herbs as medications and cosmetics is on the rise

The current study's goal is to create and assess a multipurpose herbal shampoo by removing all conventionally added synthetic components and using a variety of herbs. This shampoo strengthens, darkens, and encourages hair growth while getting rid of dandruff, sebum, and impurities. Additionally, it serves as a conditioning agent. All of these functions are carried out by this herbal shampoo powder without harming or compromising hair.

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CLASSIFICATION OF SHAMPOO:-

Herbal shampoos are cosmetic preparations that involve the use of traditional Ayurveda herbs to clean the scalp and the hair. It is an excellent natural cleanser and conditioner and adds shine and softness to hair. It prevents hair loss, boosts hair growth, controls dandruff, soothes your head, and prevents a dry scalp.

Gives you stronger, thicker hair.

1.Liquid Shampoo:-

This shampoo is a soapy liquid that you use to wash your hair. A shampoo is a hair care product used to clean the scalp and hair. It has a liquid consistency and is normally applied to wet scalps and hair. Liquid hair shampoo produces a lather when massaged into the scalp, which helps in the removal of dirt, oil, and product buildup from the hair.

2.Gel Shampoo:-

Gel shampoo is used to treat scaly, itchy skin conditions affecting the scalp, such as psoriasis, seborrhoeic dermatitis, or dandruff. Inactive ingredients: water, sodium laureth sulfate, polysorbate 20, cocamidopropylbetaine, DMDM, hydantoin tetrasodium EDTA, PEG-200 methyl glucose dioleate, cocamide MEA, citric acid, sodium chloride, and triethanolamine.

3.Oil Shampoo:-

Oil shampoo is a moisturizing shampoo with a rich, creamy lather and refreshing floral fragrance. Enriched with natural ingredients like aloe vera and argan oil, the shampoo boosts moisturization, shine, and reduces frizz. Oilbased shampoos and conditioners contain natural oils, such as argan oil, coconut oil, and olive oil, and other essential ingredients like vitamin E and antioxidants. These ingredients work together to nourish and hydrate your hair while strengthening and protecting it from damage.

4.Conditioning Shampoo:-

A conditioning shampoo retains all the features of a normal shampoo, which are to clean the hair by removing dust, dirt, and pollutants, but also has other ingredients of a conditioner that help to make hair softer and more manageable than one finds after using a normal shampoo. Along with gentle cleaning of the hair to remove dirt, Based on appearance conditioning shampoos condition the hair to keep it shiny and flexible. Conditioning shampoos have proved to be extremely good for dry hair as they add to the natural oil supply and give dry hair shine as well as strength.

5.Anti-dandroff Shampoo:-

Anti-dandruff shampoos work by killing the fungus that causes dandruff. They usually contain ingredients like ketoconazole, selenium sulfide, or zinc pyrithione, which are all antifungal agents. These ingredients work to kill the fungus and prevent it from coming back. Antidandruff shampoos. Shampoos with antidandruff activity are commonly used to treat dandruff, a scalp disorder caused by the lipophilic Malassezia yeasts, which can be suppressed by different antidandruff agents, mostly pyrithione zinc.

6.Body Shampoo:-

Total Body Shampoo is a protein-enriched, conditioning hair and body wash formulated to soothe and moisturize hair and skin. Its abundant lather and gentle cleansing action are gentle enough to use every day, and it gently cleanses to keep skin soft and smooth.

IDEAL PROPERTIES OF ANTIFUNGAL HERBAL SHAMPOO

1. Dust or soil, too much sebum or other fatty substances, and loose corneal cells from the hair should all be fully and properly removed.
2. It should generate a sufficient amount of foam to meet the user's psychological needs.
3. It should leave the hair at the very least non-dry, soft, and shiny with good manageability. Fly off.4. It should give the hair a pleasant fragrance

ADVANTAGES OF ANTIFUNGAL HERBAL HERBAL SHAMPOO

- Cleansing properties, improving hair hygiene.
- Treating scalp conditions, Treatment for dry scalp.
- Treatment for hair loss.
- Relieves itch and irritation.
- Repairs damaged hair and keeps hair silky or smooth.
- Keeps your hair beautiful and blossomed.

PROPERTIES OF ANTIFUNGAL HERBAL SHAMPOO

A healthy sheen, but when applied excessively, it gives the hair an unclean appearance. Should entirely and successfully remove the excess sebum and dust . It is important to wash hair properly.

- Should generate a substantial amount of foam.
- Rinsing with water should make it easy to remove the shampoo.
- Should result in non-dry, silky, shiny hair that is manageable.

International Journal of Pharmaceutical research and Applications
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- Should give the hair a pleasing scent.
- The hand shouldn't become rough or chapped.
- Shouldn't irritate the skin or eyes or cause any side effects.
- To give the hair a glossy, smooth finish.
- Create a sizable volume of foam.
- Must not irritate the skin, eyes, or scalp.
- Needs to eliminate dirt entirely and efficiently
- Give an attractive fragrance.

FUNCTION OF ANTIFUNGAL HERBAL SHAMPOO

- The dirt or soil should be removed completely and effectively.
- The hair should be thoroughly cleaned.
- It must generate enough foam to meet the user's needs.
- Rinsing with water should be an easy way to get rid of it.
- It ought to give the hair a pleasing scent.
- It shouldn't irritate the skin or eyes or have any negative effects.
- It ought to remove dirt or soil completely and effectively.
- It ought to wash the hair thoroughly.

PROBLEMS RELATED TO HAIRS:-

- Heat damage
- Dandruff
- Split ends
- Oily hair
- Hair loss
- Dry hair
- Colour damage

HAIR DAMAGE

The hydrophobicity of the hair is possible thanks to the 18-MEA lipid layer. Removal of this covalently linked fatty acid renders the fiber hydrophilic. When wet, virgin hair can be stretched by 30% of their original length without damage; however, irreversible changes occur when hair is stretched between 30% and 70%. Stretching to 80% causes fracture. Hair is porous and damaged hair is intensely so. Water absorption causes the hair shaft swelling. Excessive or repeated chemical treatment, grooming habits, and environmental exposure produce changes in hair texture and if extreme can result in hair breakage. These changes can be seen microscopically as "weathering" of the hair shaft and contribute to tangling, and frizzing. Weathering is the progressive degeneration from the root to the tip of the hair. Normal weathering is due to daily grooming practices. When the hair is extremely weathered and chemically treated, there may be scaling of the cuticle layers, removal of the 18-MEA and cuticle crack. If the cuticle is removed, the exposure of the cortex and further cortex damage may lead to hair fiber fracture. The use of hair cosmetics may restore hair cuticle damage and prevent hair breakage by reducing friction and water pick up.

Dandruff

Dandruff is a common scalp condition that causes the skin on the scalp to flake. It is caused by the rapid turnover of skin cells.

Normally, skin cells have a life cycle in which they multiply as needed and then die off and shed at the end of their life cycle. When a person has dandruff, the skin cell cycle is accelerated, which causes more dead cells to collect on the scalp and flake off.

The symptoms include white to yellowish or gray flakes that appear in the hair and on the shoulders as they fall from the head. The scalp is often dry and itchy.

Treatment

Home Remedies

Many types of home remedies are touted to treat dandruff, but many of these lack enough clinical research evidence to give them credibility. Those that do have some scientific evidence to back up their claims of effectiveness are agents that have antimicrobial (antibacterial or antifungal) properties. These include: Home remedies may irritate the scalp and cause contact dermatitis, which can result in an inflamed scalp and possibly make dandruff worse.

Split ends

Split ends are the result of damaged hair where the tips of your hair shaft begin to split and fray. You'll notice a hair that is split into two or more pieces.

The best way to tell if you have them is to check your hair. Simply bend one strand over your finger. Now check to see if the shaft is ragged. If your locks are starting to tangle often, you probably have split ends.

You can also ask your stylist to check your ends for any damage during your next appointment.

Different Types of Split Ends

From a traditional split to a feather split, there are a whopping 16 different types of split ends! Want to identify them on your own? Read on to learn more.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June 2026, pp:961-971 www.ijprajournal.com ISSN: 2456-4494

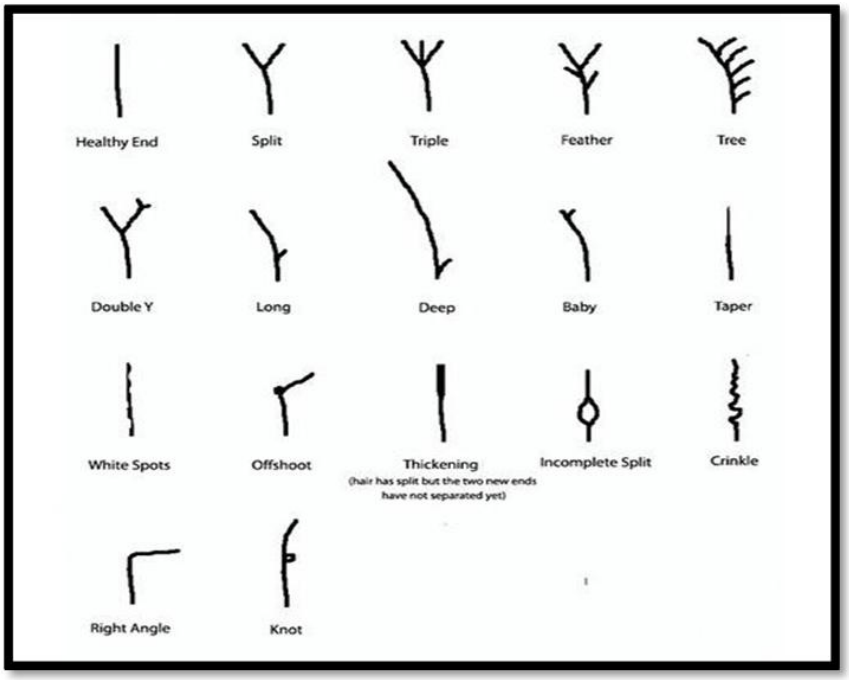

Fig: - 1Different Type of Split Ends

Oily Hair

For people with oily hair and/or skin, sebaceous glands are working overtime and/or are in greater numbers, producing an excess of sebum. Genetics, puberty, heat, and humidity also affect oil production.

People who have fine, straight hair texture and/or an abundance of hair tend to have oilier hair than those with curlier locks and/or less hair.

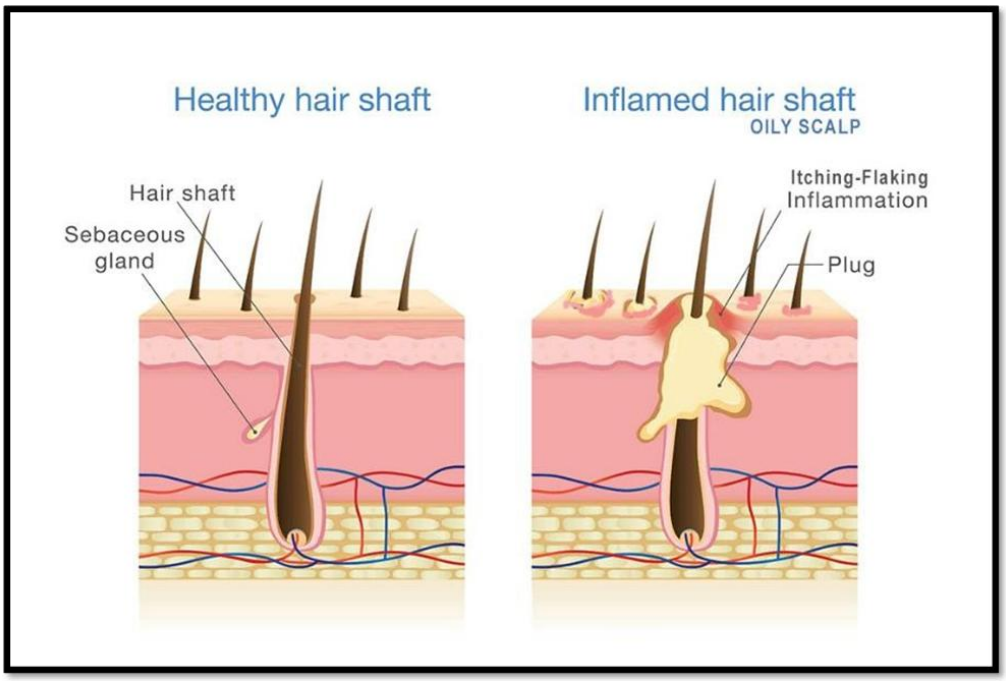

Fig 2 Hair Conditions

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June 2026, pp:961-971 www.ijprajournal.com ISSN: 2456-4494

Dry Hair

Genetics can cause your hair to look dry and dull all the time. While there is little you can do to change your genes, you can use a lot of moisturising hair care products that are specifically meant to treat severely dry hair and use them consistently to keep your soft and bouncy at all times.

Dry hair can result in breakage, a flyaway or frizzy appearance, and a loss of shine and softness. Though often the result of some hair care practices, dry hair can also accompany medical conditions.Managing dryness is essential to beautiful, healthy hair. Treatment may include avoiding heated styling tools, regularly using conditioner, and eating a balanced diet. People with underlying medical conditions that cause dry hair may need additional treatment from a healthcare professional.

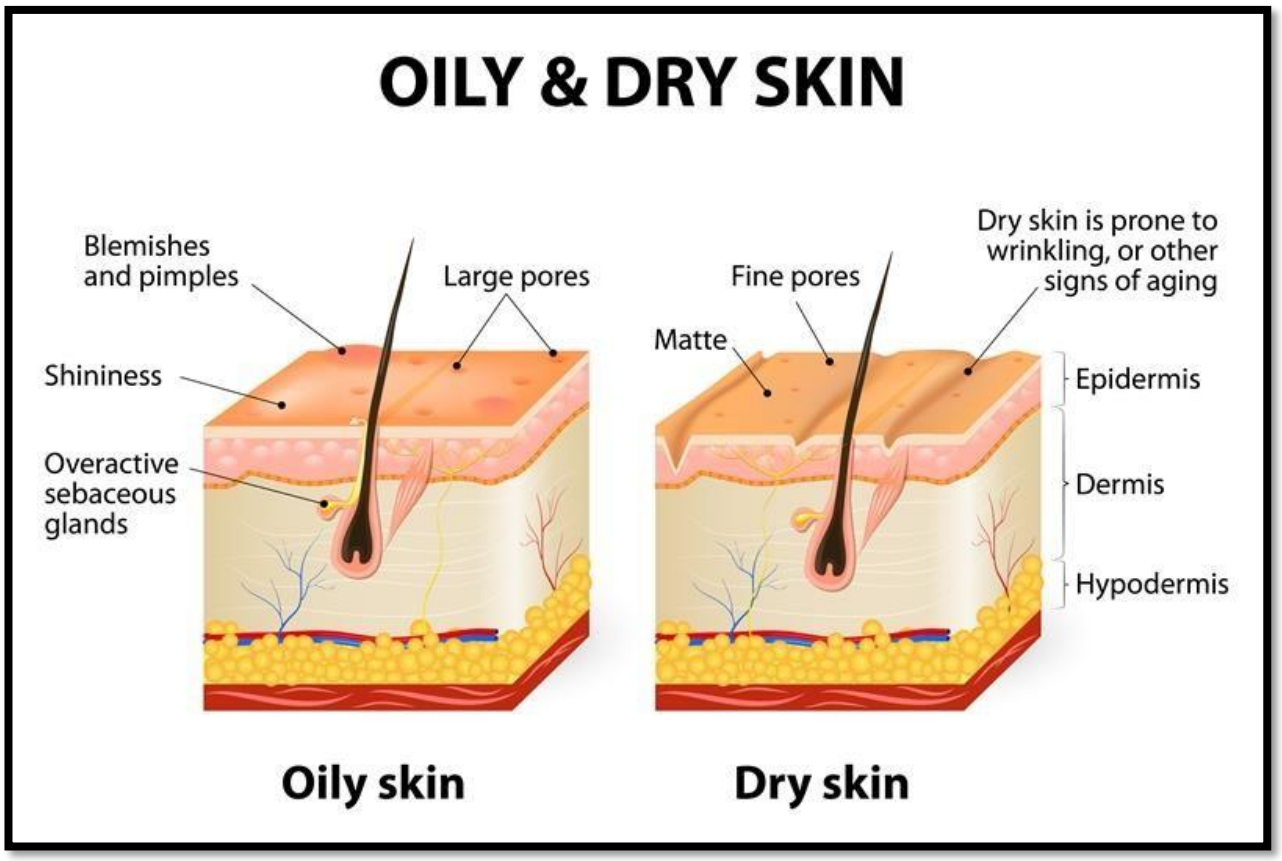

Fig: -3 Dry Skin Damage

Colour Damage

Colour blindness can be simply defined as trouble in seeing or identifying colours like blue, green and red. There are some rare cases where a person cannot see and identify any colours at all. A person with this syndrome also finds difficulties in differentiating the colours with shades. This syndrome is also called a colour vision problem or colour vision deficiency.

Colour blindness was discovered by an English chemist named John Dalton in the year 1798. During the discovery, he was also suffering from colour blindness. He wrote his first article about colour blindness, which was based on his own experience. Colour blindness is also called as Daltonism, which is named after its discoverer – John Dalton.

II. MATERIALS AND METHOD

Table 1: Ingredients Table

S.no.	Ingredients	Quantity (ml)	Use
1.	Reetha Extract	5	Foaming agent

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June 2026, pp:961-971 www.ijprajournal.com ISSN: 2456-4494

2.	Neem Extract	5	Antibacterial
3.	Aloevera extract	2.5	Moisturizing agent
4.	Methyl parabean	0.05	Preservative
5.	Shikakai Extract	5	Antidandtruff agent
6.	Rose water	Q.S	Flavouring agent
7.	Citric acid	2.5	Ph Adjuster
8.	Distilled water	50	Vehicle
9.	Amla Extract	5	Antioxidant

III. METHDOLOGY

1.Take 5g each of reetha, shikakai, amla, neem, tulsi powder.
2.Add about 50ml of distilled water.
3. Boil for 15-20 minutes, cool, and filter.
4. Collect filtrate. (this is combined herbal extract)
5.Take 25 ml distilled water in a clean.
6. Add aloe vera gel, mix.
7.Continue stirring until a uniform blendtoobtained.
8. Dissolve methyl paraben in a small amount of warm water, then add to the mixture.
9. Adjust ph between 6.5 using citric acid solution.
10. Transfer the prepared shampoo into a clean, dry, labeled bottle.

IV. EVALUATION PARAMETER OF SHAMPOO: -

1. Determination of pH: -
2 mL of the polyherbal shampoo solution was taken into a Petri dish. After that, a pH litmus paper was dipped into the 2 mL solution. The observed pH was found to be 5.5 to 6.5.

Fig:-4 ph test

2. Physical appearance:
The prepared formulations were assessed for fluidity, clarity, and capacity to produce foam.

Table 2. physical appearance

Color	Brownish color
Odor	Characteristic
Transparency	Not transparent
Texture	Smooth

3. Determination Percentage of solid content:-
Weighing an evaporating dish that was dry and clean, we added 4g of shampoo to it. Weighed were the dish and shampoo. Once the precise weight of the shampoo was determined, the liquid portion was allowed to evaporate by placing the evaporating dish containing the shampoo on a hot plate.
After drying weight of the shampoo alone was determined.

4. Rheological Evaluation:-
A Brookfield viscometer was used to measure the shampoos viscosity. After dipping a spindle for approximately five minutes in a beaker containing ten millimeters of shampoo, readings are taken.

5. Dirt Dispersion:-
10 ml of distilled water were placed in a large test tube, and two drops of shampoo were added. After adding one drop of India ink, the test tube was stopped and shaken ten times none, light moderate, or heavy were the estimated amounts of ink in the foam.

6. Cleansing action:-
Crease was applied to 5gm of albino mouse, which was then submerged in 200 millimeters of water in a flask containing 1 gram of soap. The water's temperature was kept at 350 degree. For four minutes, the flask was shaken fifty times per minute. After removing the solution, the sample was removed, dried and weighed. The following formula was used to determine the amount of grease removed DP is equal to 100(1/T/C). Where, T is the weight of sebum in the test sample, is the weight of sebum in the control sample, and DP is the percentage of detergency power.

7. Surface tension measurement:-
A stalagmomter was used at room temperature to measure the surface tension of he shampoo that had been prepared in 10% w/v distilled water.

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8. Foaming ability and stability:-

To evaluate the foaming ability, the cylinder shake method was used**.** 1.5 mL of polyherbal shampoowas taken in a 10 mL graduated cylinder. The cylinder was covered by hand and shaken 10–12 times. After shaking, the foam produced was measured**.**

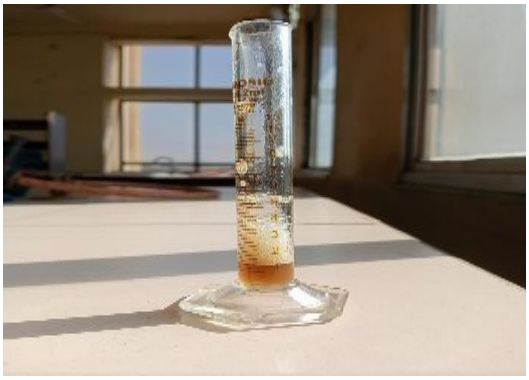

Fig:-5 Foaming ability and stability

9. Stability studies:-

The cylinder shake method was utilized to ascertain the stability of the foam. A graduated 250ml qcylinder was filled with approximately 50ml of the 1% solution for shampoo, and it was vigorously shaken ten times. By measuring the foam volume of the shake test after one minute and four minutes, respectively, foam stability was determined. The entire volume of foam was measured following a minute of shaking.

10. Wetting time:-

By keeping track of how long it took the canvas paper to fully sink, the wetting time was computed. An inchdiameter disc made of 0.42 g of canvas paper was cut into pieces. The canvas paper disc was placed over the shampoo surface, and the stopwatch was used to time how long it took the paper to sink.

11. Skin irritation test:-

Arranged natural cleanser was applied on skin for 5 minutes after that was washed and tried for bothering or aggravation to the skin.

12. Conditioning performance:-

An artificial hair tress of Indian women was received from a salon and divided into two swatches of length 10cm approximately, weighing 5g. The control swatch was the one without washing and the test swatch using the formulated shampoo was washed with. Each tress was added fro 2 min to the combination of shampoo in water in the proportion 10:15 taken in a conical flask and washed using 50 ml of distilled water. Each tress was air dried at room temperature and the procedure was repeated for maximum of 10 times. The conditioning effected of the prepared shampoo in terms of softness and smoothness as determined using a blind touch test using volunteers of student 20 numbers selected randomly. All the students were blind folded and asked to touch and rate the four tresses for conditioning performance from score 1 to 4.

13. Detergency ability:-

The Thompson method was used to evaluate the detergency ability of the samples. Briefly, a crumple of hair was washed with a 5% laurel glucoside solution, then dried and divided into 3g weight groups. The samples were suspended in a hexane solution containing 10% artificial sebum and the mixture was shaken for 15 min at room temperature. Then samples were removed, the solvent was evaporated at room temperature and their sebum content determined. Finally the percentage of detergency power was calculated using following equation DP=100 (1T/C) in which DP is the percentage of detergency power, C is the weight of sebum of the control sample and T is the weight of sebum in the test sample.

14. Anti-Microbial Assay:

Values are mean for four imitates Microbiological appraisal of Cleanser Assessment of the nature of thecleanser at microbiological level was finished to affirm the sufficiency of the non-expansion of additive to thecleanser to decide how long the cleanser tests would be really great for use according to a microbiologicalperspective, Francis and Boniface, (2017). Toward the finish of every week after week timespan accomplishedfor quite some time, there was no proof of microorganisms or parasites development on the way of life packsfrom the two examples. It very well may be inferred that the cleanser isn't auspicious to the development ofgrowths and microorganisms.

V. RESULT AND DISCUSSION

The current research aims to effectively create an herbal hair shampoo using traditional herbal extracts known for their hair cleansing properties in India. All the components utilized in crafting this herbal shampoo are demmed safer in comparison to commercially available products.

International Journal of Pharmaceutical research and Applications
Volume 11, Issue 3, May-June 2026, pp:961-971 www.ijprajournal.com ISSN: 2456-4494

The characterization of the herbal shampoo demonstrated favorable outcomes. Further investigations are needed to enhance the stringent quality assessment of the product, particularly through animal testing, and to evaluate its performance under various conditioning conditions. As seen from the results, it is possible to formulate synthetic additives, which are normally incorporated in such formulations. Numerous tests were conducted to assess the effectiveness of the prepared shampoo.

The outcomes of the evaluation of the newly the prepared shampoo. The outcomes of the evaluation of the newly formulated shampoo indicated similar in terms of quality control assessment. However, additional scientific confirmation is required to verify its overall quality.

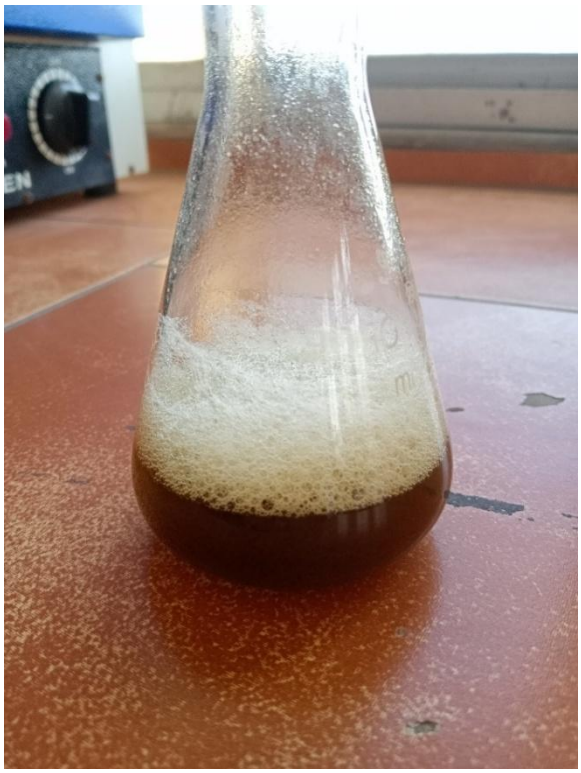

Fig: -6 Final Prepared Antifungal Herbal Shampoo

VI. CONCLUSION

Preparation and evaluation of poly- herbal shampoo is a complex process that requires carefulconsideration of various factors, such as the selection of plant or herbal ingredients required forformulation, their extraction method, and the evaluation of the end or final product for its safetyand efficacy. The use of herbal ingredients or plants in shampoo formulation offers potentialbenefits such as improved hair health, reduced environmental impact, inhibited hair fall, and aboost to new hair growth. However, it is important to conduct testing and evaluation to ensure thesafety and effectiveness of the product. Overall, the estimation and assessment of herbal shampoois an important area for research that has the potential to offer consumers a more natural andsustainable hair care option.

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