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A Review on Herbal Shampoo and Its Evaluation

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Abstract: *The most popular hair care method is shampooing. Shampoos are generally designed to be hair and scalp cleaners. While herbal shampoo is safer and performs better than synthetic ones, it is unlikely to become widely popular among customers under the current market conditions. Changing customer expectations by emphasizing safety and efficacy would be a more radical strategy to popularize Herbal shampoo. This research focuses on composition, kinds, evaluation techniques, and a synopsis of herbal shampoo formulations. The work aimed to produce a pure herbal shampoo and evaluate and compare its physicochemical qualities with herbal and synthetic shampoos that are sold commercially.*

Keywords: Herbal Shampoo, Types, Formulation, Evaluation methods

I. INTRODUCTION

Products intended to remove excess oil, filth, and dandruff from the scalp and hair are referred to as hair care products. Additionally nourishing and imparting a healthy appearance to hair are hair care products. This century saw the advent of true hair and scalp washing technologies with the creation of cake soap and the following development of shampoo products. The world of shampoo originated in the Indian subcontinent. It originates from the 1762 Hindi term shampoo, which meaning to rub the head with hair oil. Shampoos are cosmetic preparations that clean the hair and scalp. Eliminating accumulated sebum, scalp residue, and hair grooming product residue is its primary goal.

Sodium lauryl sulphate, a typical surfactant, irritates the scalp and destroys hair follicles when used in shampoo. Formaldehyde and other preservatives are added to shampoo recipes, making the skin more sensitive. Customers prefer herbal products over synthetic ones because they are aware of the harm that synthetic products may do to their skin, hair, and eyes. Herbal products rarely have negative side effects. There are numerous varieties of shampoos, such as lotions, powders, transparent liquids, medicinal shampoos, liquid herbal shampoos, and solid gels. The criteria for instability in herbal shampoos is discussed. Depending on the ingredients of each, these can be categorized as basic or simple shampoo, antibacterial or anti-dandruff shampoo, or nutritional shampoo with hydrolysed proteins, vitamins, and amino acid.

Ideal Characteristics of Herbal Shampoo

- Shampoo should efficiently rid the hair and scalp of extra sebum and dust.
- Shampoo needs to wash hair effectively.
- Rinsing with water should make shampoo removal simple.
- Hair that has been shampooed should be shiny, manageable, and not dry.
- Hair shampoo shouldn't cause rough hands.[3]
- Shampoo ought not to cause any adverse reactions or irritate the skin or eyes.
- Shampoo ought to be able to spread and disperse effortlessly across hairs.
- Shampoo needs to create a thick, opulent foam.
- It ought to work in modest doses.
- Combability of wet hair.
- It shouldn't leave your hands chapped and rough

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Composition of Herbal Shampoo

• An anti-dandruff product; Primary dispersant; Secondary surfactant.
• Preserving material.
• A material like pearls.
• Something to thicken.
• Antioxidants, fragrances, and colours.
• Electrolytes like NaCl, NH, and CI are examples of viscosity modifiers.
Alginates, Tragacanth, and Karaya gum are examples of natural gums.
• Alternatives to tissue: hydroxyethylcellulose and methylcellulose.
• Vinyl carboxyl plastics: Carbopol 934.
• PVP esters are an alternative.
• Opacifying agents: spermaceti, propylene glycol, alkanol amides of higher fatty acids, and salts of stearic acid in magnesium, calcium, and zinc, among others.
• The clarifying agents are isopropanol and ethanol, which dissolve phosphates and alcohols.
• Non-ionic solubilizers include polyethoxylated alcohols and esters.
• Fragrances: floral, herbal, or fruity.
• Anti-dandruff herbs include Tulsi, shikakai, and neem. Sixth (6)
The majority of surfactants are found in shampoo. Surfactants are mostly anionic substances. The primary ingredients used in the creation of shampoo are principal surfactants, which provide detergency and foam.

Types of Shampoos

- Conventional Shampoo
- Medicinal Shampoo
- Solid Shampoo
- Powder Shampoo
- Liquid Shampoo
- Cream Shampoo
- Jelly Shampoo
- Aerosol Shampoo

Conventional Shampoo:

Shampoo is the most popular hair care product. Arora et al. define it as a convenient cosmetic preparation that is used to the hair and scalp to eliminate environmental toxins, remaining hair style product residue, and debris.

Medicinal Shampoo:

Paradoxically, a wide range of plants are used in shampoos and have good benefits on hair because they include vitamins, amino acids, sugars, glycosides, phytohormones, bioflavonoids, fruit acids, and essential oils. methods that are useful for cleaning hair in various ways, intentionally contaminating it, and utilizing gas chromatography to examine the lipids that remain on the hair

Ingredients	Medicinal uses
Neem	Antibacterial agent
Soap nut extract	Foaming agent
Amla extract	Antidandruff agent
Shikakai extract	Detergent
Hibiscus	Conditioning agent
Bhringraj	Hair growth
Aloe vera	Moisturizing agent
Gelatin	Gelling agent

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Lemon Juice	Antimicrobial agent

Solid shampoo:

In comparison to liquid formulations, solid shampoos have higher microbiological stability, which facilitates transportation and prolongs their shelf life. These are just a few of the advantages that solid shampoos have over conventional ones.

Powder shampoo:

When water or another solvent is added, the constituents' activity is reduced, especially in the case of medicated shampoo. This is how powder shampoo is prepared; due to the difficulties in applying them, these shampoos are no longer in use. Originally made from dry soaps, it is now available as dry powder. Today, dry synthetic detergents are used in its preparation.

Ingredients	Biological Source	Uses
Amla fruit	ripe fruits of E. officinalis	Hair darkening Hair growth promoter
Neem	Dried leaves of A. indica	Anti-dandruff agent Anti-bacterial agent
Shikakai fruit	Dried pods of A. concinna	Foaming agent Anti-dandruff agent
Tulsi	Dried leaves of O. sanctum	Anti-dandruff agent
Bahera	Dried fruits of T. bellirica	Hair darkening Hair growth promoter
Brahmi	Dried leaves of C. asiatica	Support Health of Hair
Henna	Dried leaves of L.inermis	Hair conditioner

Liquid shampoo:

These transparent liquid combinations are the most often used. Low cloud point detergent is usually used to make these. There may be transparent versions of these shampoos available.

SLS	40%	Cleansing and foaming agent
Nacl (to desired viscocity)	2-4%	Thickener
Water	Upto100%	Vehicle
Perfume,colour,preservatives	q.s	Fragrance

Cream shampoo:

Modified transparent liquid cream shampoos are known as lotion shampoos. Magnesium stearate is one of the solubilizing agents used to dissolve the additional opacifier. (19, 21; 20)

SLS	38%	Cleansing and foaming agent
Cetyl alcohol	7%	Moisturizer
Water	Upto100%	Vehicle
Color,perfume	q.s	Fragrance
Preservatives	q.s	Prevent the microbial growth

Jelly shampoo:

These have a viscous, thick texture. generally achieved by adding a gelling ingredient (cellulose, for instance).It's widely used in beauty salons and hair salons. The primary ingredient, detergent, can be used with laundry soap or without it. By varying the detergent proportion, the gel can be brought to the required consistency. Another way to make gel shampoo is to thicken clear liquid shampoo by adding methyl cellulose.

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Alkyl dimethyl benzalkonium Choride	15%	antimicrobial agent
TLS(40%)	28%	Baby shampoo
Coconut ditethanolamide	7%	stabilise the foam
HPMC	1%	Foam enhancer and stabilizer, thickener, emulsion stabilizer
Water	Upto100%	Vehicle
Color,perfume, preservatives	q.s	Fragrance, prevent the microbial growth

Aerosol shampoo:

spray Shampoos are the name given to them because of the spray containers in which they are manufactured. Their formulation, preparation, and packing are complex due to the employment of an additional propellant. In order to keep the components in the shampoo active, the propellant that is added must be mixed thoroughly. In the container space, there is a valve. Shampoo-like foam appears when the valve is pressed.It is hence also known as foam type shampoo.

TLS	60%	Baby Shampoos
Coconut ditethanolamide	2%	stabilise the foam
Water	Upto90%	Vehicle
Propellant	10%	Cleaner
Color,perfume, preservatives	q.s	Fragrance, prevent the microbial growth

METHOD OF PREPARATION:

Plant:

Dr. P Jayaraman, the head of the Plant Anatomy Research Center in Chennai, is a botanist. The plant materials required for this study were obtained from different areas in Chennai, Tamil Nadu, and then validated.

Preparation of extract

A weight of approximately 100 g was achieved by homogenizing the following plant materials: H. rosa-sinensis, E. officinalis, A. concinna, S. indica, E. prostrate, A. Barbadensis, and C. auriculata. The powdered substance was boiled for four hours and then extracted using distilled water.

Formulation of herbal shampoo

The fomulation of the herbal shampoo was done using the formula shown in Table 1. Every twenty minutes, the ten percent gelatin solution was shaken well and infused with herbal extract. One milliliter of lemon juice was then added while constantly swirling. To improve the scent, enough rose oil was added to the mixture, and gelatin was added to bring the amount up to 100 milliliters.

Table No 1: Ingredients of the herbal shampoo

Material Required	Quantity to be weight
Soap nut extract	0.5g
Amla extract	0.5g
Shikakai extract	0.5g
Hibiscus	0.5g
Bhringraj extract	0.5g
Senna extract	0.5g
Aloe vera	1g
Gelatin	q.s
Lemon juice	q.s
Rose oil	q.s

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HERB USE IN PRAPRATION OF SHAMPOO:

Sr No.	Common Name	Biological Source (Family)	Chemical Constituent	Category
1	Hibiscus	Flower of Hibiscus rosa-sinensis (Malvaceae)	anthocyanins and polyphenols (protocatechuic acid and quercetin)	Conditioning agent
2	Amla	Fruit of Amla Emblica Officinalis (Phyllantehacea)	polyphenols (ellagic acid, chebulinic acid, gallic acid	Anti dandruff agent
3	Shikakai	Powder of Acacia concinna (Fabaceae)	Lupeol, spinasterol, acacic acid, lactone	Detergent
4	Soapnut	Fruit of Sapindus indica (Sapindaceae)	saponins (10%-11.5%), sugars (10%) and mucilage10	Detergent
5	Cassia	Leaves of Cassia auriculata (Fabaceae)	flavones, flavonols, flavonoids glycosides, alatinon, alanonal	Anti dandruff agent
6	Bhringraj	Flower of Eclipta prostrate (Asteraceae)	Ecliptal, β-amyrin, Luteolin-7-O-glucoside, Hentriacontanol	Hair growth
7	Aloe vera	Leaf of Aloe barbadensis (Liliaceae)	chromone and anthraquinone and its glycoside derivatives	Coolant

Fig 1: Hibiscous

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Fig 2: Amla

Fig3: Shikakai

Fig4: Soapnut

Fig5: Cassia

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Fig6: Bringraj

Fig7: Aloe vera

EVALUATION PARAMETERS

The developed formulation's product performance was assessed by evaluating its solid content, physicochemical characterisation, pH, and organoleptic qualities. Specific tests were carried out in accordance with established practice for surface tension, foam volume, foam stability, and wetting time to verify the nature of the products.

1. Determination of pH:

1% solution of the formulation was prepared together with the standard marketed items, and the pH was measured using a digital pH meter. 200 milliliters of distilled water and 2 milliliters of shampoo were combined in a beaker to create a 1% shampoo solution. Without shaking, the shampoo and water were combined with a swirling motion in the beaker.

2. Determination of percentage of solids:

Firstly, the weight of an evaporating dish that was empty, dry, and clean was measured and recorded. After adding a 4 gram sample, the weight of the evaporating dish was measured to ascertain the precise beginning weight of the shampoo. By setting the evaporating dish on a hot plate and keeping an eye on the shampoo's weight until it evaporated entirely, the shampoo was dried. The percentage of solids was calculated using the procedure below.

Percentage of solids: (Dried weight of shampoo/Initial weight of shampoo)*100.

3. Determination of the foam formulation:

A dry, clean measuring cylinder was filled to the full capacity with 50 ml of the herbal shampoo composition. This made it possible for us to figure out how much foam the herbal shampoo produced. The final volume was calculated by shaking the measuring cylinder ten times. The following was the foam's formula: Shampoo's final volume - beginning volume of foam creation.

4. Determination of the viscosity:

A Brookfield viscometer was used to measure the viscosity, and the spindle speeds were changed between 0.3 and 10 rpm3. Each shampoo's viscosity was measured using Spindle T95. Throughout the research, the size and temperature of the sample container remained constant.

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5. Dirt dispersion test:

In a large test tube, ten milliliters of distilled water and two shampoo drops were combined. One drop of India ink was added to the mixture, and the test tube was stopped and shaken ten times. The rubric specified whether the ink in the foam was light, moderate, thick, or not present at all.

6. Surface tension measurement:

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

7. Physical appearance/visual inspection:

The created formulations were evaluated for clarity, foam production capability, and fluidity.

8. Wetting time:

The canvas was divided into discs with a diameter of one inch and an average weight of 0.44 grams each. On the surface of the 1% w/v shampoo solution, the disc floated, and then the stopwatch was started. The exact length of time the disc required to begin sinking is known as the "wetting time."

9. Rheological evaluations:

We measured the viscosity of the shampoos using a Brookfield Viscometer (Model DV-1 Plus, LV, USA). Spindle speeds were modified to be between 0.3 and 10 rpm3. The shampoos' viscosity was measured with Spindle T95. There were no variations in the temperature or sample container size throughout the trial.

10. Cleaning action:

Grease was used to soak five grams of wool yarn, which were then added to a flask containing 200 milliliters of water and one gram of shampoo. At 350 degrees Celsius, the water was maintained. 50 shakes per minute were administered to the flask for four minutes. After removing the solution, the sample was removed, dried, and weighed. The amount of grease that was removed was calculated.

11. Detergency ability:

The Thompson technique was utilized to evaluate the samples' detergency capacity. In short, a clump of hair was dried, washed with a 5% sodium lauryl sulfate (SLS) solution, and divided into three weight groups based on grams. Once the samples were combined with a 10% fake sebum solution in n-hexane, the mixture was allowed to settle at room temperature for fifteen minutes. Following the removal of the solvent and a room temperature evaporation period, the sebum content of the samples was determined. Once divided into two equal parts, the samples were utilized as the negative control. The other half was then cleaned with 0.1 ml of the 10% test shampoo. Twenty milliliters of n-hexane were used to remove the sebum from the samples after they had dried, and the weight was then recorded once again.

12. Foaming ability and foam stability:

The cylinder shake method was utilized to evaluate the foaming capacity. The 1% shampoo solution was applied to 50 ml in a graduated cylinder with a capacity of 250 ml. The cylinder was then covered and given five shakes with the hand. The total quantities of the foam contents were recorded after a minute of shaking. The only amount computed was the foam's volume. Immediately after, the volume of foam was measured and recorded every minute for four minutes.

13. Skin sensitization test:

A total of three sets of seven guinea pigs were produced. The day before the experiment started, the hair on the posteriors of the guinea pigs was clipped. Shampoo treatments were administered to groups of animals' naked skin. A 0.8% v/v aqueous solution of formalin was used as a standard irritant on the animals. The same researcher used a visual grading system to assess the application locations after giving the animals new patches or formalin solution for up to 72 hours. One, minor, two, well-defined, three, moderate, and four, scar development (severe) were the four points on the erythema scale.

14. Eye irritation test:

Albino rats, the animals, were obtained from the animal home. A solution of 1% shampoo was drip-fed into the eyes of six albino rabbits, holding their lids open with clips. Over the course of four seconds on average, the rabbit's eyes continued to sustain increasing damage. This was recorded at regular periods. The irritants may cause blindness, ulceration, swelling of the eyelid, inflammation of the iris, and hemorrhaging.

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15. Surface characterization:

Investigating the surface morphology of the hairs was done with scanning electron microscopy (Leo 430, Leo Electron Microscopy Ltd., Cambridge, England). Double-sided sewing tape was used to mount the hair samples directly onto the SEM sample stub. A 200 nm thick gold film was then applied to the samples at a pressure of 0.001 mm Hg.

16.Stability studies:

To investigate the thermal stability of formulations, glass tubes were used and maintained in a humidity room at 45°C and 75% relative humidity. Their physical stability and looks were assessed every month for three months.

17.Visual assessment:

Color, clarity, odor, and foam content of the produced mixture were evaluated. Measuring surface tension. The surface tension of the shampoo made with 10% w/v distilled water was measured at room temperature using a stalagmometer.

FUTURE SCOPE:

In the future, it has a good possibility of becoming a gene-rating employment because the majority of the ingredients are herbal and widely accessible in rural areas. There will be more exports than imports, which will increase the nation's income.

II. CONCLUSION

The primary objective of the study was to develop a shampoo that is 100% herbal and equally effective as commercially available synthetic shampoos. Our herbal shampoo was made with plant extracts, which are commonly used in traditional medicine. Acclaim for their hair-cleaning abilities spread throughout Asia. All the ingredients used to manufacture shampoo are therefore far less likely than synthetic conditioning agents like silicon dioxide and polyquaterniums to induce hair or protein loss when combing. By using plant extracts, such as Shikakai, Amla, Ziziphus, and others, instead of cationic conditioners, we were able to accomplish the conditioning outcomes. An array of tests will be employed to evaluate and compare the physicochemical properties of both commercial and homemade shampoos. The produced shampoo passed quality control tests.

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