

A Review on Herbal Shampoo and Its Evaluation

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ABSTRACT:

Shampooing is the most common form of hair treatment. Shampoos are primarily been products aimed at cleansing the hair and scalp. In the present scenario, it seems improbable that herbal shampoo, although better in performance and safer than the synthetic ones, will be popular with the consumers. A more radical approach in popularizing Harbal shampoo would be to change the consumers' expectations from a shampoo, with emphasis on safety and efficacy. The present paper emphasizes on composition, types, methods of evaluation, also a brief review on herbal shampoo formulations Formulating a pure herbal shampoo and assessing and contrasting its physicochemical properties with commercially available synthetic and herbal shampoos were the goals of the study. From this review it conclude that the extracts of *Acacia concinna*, *Sapindus mukorossi*, *Phyllanthus emblica*, *Ziziphus spina-christi*, and *Citrus aurantifolia* will be added in varying amounts to a 10% aqueous gelatin solution to create the herbal shampoo. Also as a preservative, a small amount of methyl paraben will be added, and citric acid used to adjust the pH.

KEYWORDS: Herbal Shampoo, Types, Formulation, Evaluation methods.

INTRODUCTION:

Hair care products can be characterized as a preparation designed to eliminate excess oil, dirt, and dandruff from the scalp and hair. Products for hair care also nourish hair and give it a healthy appearance. The invention of cake soap and the subsequent development of shampoo products in this century marked the beginning of the real technology for cleaning the hair and scalp. The Indian subcontinent is the source of the world of shampoo. It comes from the Hindi word champo, which means to massage the head using hair oil, and dates back to 1762A shampoo is a hair and scalp cleansing cosmetic preparation. Its main purpose is to rid the hair of built-up sebum, scalp debris, and hair grooming product residue. Shampoos also serve as lubricants, conditioners, medications, and other additional purposes. Surfactant serves as the primary ingredient in the preparation of the shampoo, with additional ingredients serving to boost the product's efficacy. Market-available shampoo contains artificial ingredients that are bad for the skin. These negative effects are not well known to most

consumers. The common surfactant sodium lauryl sulphate damages hair follicles and irritates the scalp when used in shampoo. Preservatives like formaldehyde are also added to shampoo formulas, which increases the sensitivity of the skin. (4) Because consumers are now aware of the negative effects that synthetic products can have on their skin, hair, and eyes, they choose herbal products over synthetic ones. The adverse effects of herbal products are minimal. There are many different types of shampoos, including medicated shampoos, liquid herbal shampoos, lotions, powders, clear liquids, and solid gels. The instability criteria for herbal shampoos is addressed. These can be classified as basic or plain shampoo, antiseptic or anti-dandruff shampoo, or nutritional shampoo with vitamins, amino acids, and proteins hydrolyzed, depending on the makeup of the ingredients. [5]

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.[6]

Composition of Herbal Shampoo

- Principal Dispersant.
- Surfactant Secondary.
- An anti-dandruff product.
- Conditioning substance.
- Pearl-like substance.
- Agent for thickening.
- Colors, Fragrances, and Antioxidants.
- Shampoo is mostly composed of surfactants. The majority of surfactants are anionic. Principal surfactants, which offer detergency and foam, are the main chemicals utilized in the production of shampoo.
- Shikai is a foam builder.
- Viscosity modifiers: electrolytes such as NaCl, NH, and Cl.
- Natural gums: Alginates, Tragacanth, and Karaya gum.
- Tissue substitutes: methylcellulose, hydroxyethylcellulose.
- Plastics made of carboxyl vinyl: Carbopol 934.
- Other: esters of phosphate, PVP.
- Agents for sequestration: EDTA.

- Opacifying agents: Propylene glycol, magnesium, calcium, and zinc salts of stearic acid, spermaceti, and alkanolamides of higher fatty acids, among others.
- Agents for clarification: ethanol and isopropanol, which dissolve alcohols, phosphates.
- Polyethoxylated alcohols and esters are non-ionic solubilizers.
- Fragrances: Fruity, floral, or herbal.
- Formaldehyde and parabens are examples of preservatives.
- Neem, tulsi, and shikakai are anti-dandruff agents. (6)

Types of Shampoos



Conventional Shampoo:

Shampoo is the most widely used cosmetic product for hair care. According to Arora et al., it's best described as a convenient cosmetic preparation that's applied to the hair and scalp to remove dirt, leftover hair styling product residue, and environmental contaminants.

Medicinal Shampoo:

Interestingly, because they contain vitamins, amino acids, sugars, glycosides, phytohormones, bioflavonoids, fruit acids, and essential oils, a wide variety of plants are used in shampoos and have positive effects on hair. helpful procedures for cleaning hair in different ways, artificially soiling it, and using gas chromatography to analyze the lipids that are still present on the hair (18)

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
Lemon juice	Antimicrobial

Solid shampoo:

There are a few more benefits that solid shampoos offer over conventional ones. Compared to liquid formulations, they have greater microbiological stability, which makes them easier to transport and extend the shelf life.

Powder shampoo:

Originally made from dry soaps, it is now available as dry powder. Today, dry synthetic detergents are used in its preparation. When water or another solvent is added, the constituents' activity is reduced, particularly 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.

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

Liquid shampoo:

The most popular are these transparent liquid mixtures. They are typically made with low cloud point detergent. These shampoos might come in transparent varieties.

SLS	40%	Cleansing and foaming agent
Nacl (to desired viscosity)	2-4%	Thickener
Water	Upto 100%	Vehicle
Perfume, colour, preservatives	q.s	Fragrance

Cream shampoo:

Lotion shampoos are a type of clear liquid cream shampoo that have been modified. The added opacifier is also dissolved using solubilizing agents like magnesium stearate. (19,21,20)

SLS	38%	Cleansing and foaming agent
Cetyl alcohol	7%	Moisturizer
Water	Upto 100%	Vehicle
Color, perfume	q.s	Fragrance
Preservatives	q.s	Prevent the microbial growth

Jelly shampoo :

These have a thick, translucent texture. create typically by adding a gelling agent (cellulose, for example).Hair salons and beauty parlors find extensive use for it. Laundry soap can be used alone or in combination with detergent, which is the main ingredient. The necessary consistency of gel can be achieved by adjusting the detergent proportion. Gel shampoo is also created when methyl cellulose is added to clear liquid shampoo and then thickens.

Alkyl dimethyl benzalkonium Chloride	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:

Because of the aerosol containers in which they are packaged, they are known as aerosol Shampoos. Because an extra propellant is used, their formulation, preparation, and packing are complicated. The propellant that is added needs to be combined and shouldn't lessen the ingredients that make shampoo active. A valve is provided in the container space. Pressing the valve causes foam to emerge as shampoo. Consequently, foam type shampoo is another name for it.

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:

The plant materials needed for this study were sourced from various locations in Chennai, Tamil Nadu, and verified by Dr. P Jayaraman, the director of the Plant Anatomy Research Center in Chennai, who is a botanist.

Preparation of extract

Each of the following plant materials—*H. rosa-sinensis*, *E. officinalis*, *A. concinna*, *S. indica*, *E. prostrate*, *A. Barbadosensis*, and *C. auriculata*—was homogenized to a weight of about 100 g. Using distilled water, the powdered material was extracted after four hours of boiling. After being separated, the extract from each plant material evaporated.

Formulation of herbal shampoo

The formula in Table 1 was followed in the fomulation of the herbal shampoo. Herbal extract was added to the gelatin solution (ten percent) and thoroughly mixed while shaking every twenty minutes. And with

continuous stirring, 1 ml of lemon juice was added. Rose oil was added in sufficient quantity to the formulation to improve the aroma, and gelatin was used to raise the volume 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

➤ **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 (Phyllanthaceae)	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 mucilage ¹⁰	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



Fig1: Hibiscus



Fig2: Amla



Fig3: Shikakai



Fig4: Soapnut



Fig5: Cassia



Fig6: Bringraj



Fig7: Aloe vera

EVALUATION PARAMETERS

Organoleptic properties, pH, physicochemical characterization, and solid content were all evaluated as part of the prepared formulation's product performance assessment. In order to confirm the nature of the items, specific tests for surface tension, foam volume, foam stability, and wetting time were conducted according to standard procedure.

1. Determination of pH:

Together with the typical marketed products, a 1% solution of the formulation was made, and a digital pH meter was used to measure the pH. A 1% shampoo solution was made by combining 200 ml of distilled water with 2 ml of shampoo in a beaker. The beaker was swirled to combine the shampoo and water without being shaken.

2. Determination of percentage of solids:

Prior to anything else, the weight of an empty, dry, and clean evaporating dish was determined and noted. The exact initial weight of the shampoo was determined by measuring the weight of the evaporating dish after a 4 gm sample was added. Shampoo was dried by placing the evaporating dish on a hot plate and monitoring the weight of the shampoo until it evaporated completely. Using the following formula, the percentage of solids was determined. [13]

Percentage of solids: $(\text{Dried weight of shampoo} / \text{Initial weight of shampoo}) * 100$.

3. Determination of the foam formulation:

50 ml of the herbal shampoo formulation was added to a dry, clean measuring cylinder, and the initial volume was noted. This allowed us to calculate the amount of foam the herbal shampoo produced. By shaking the measuring cylinder ten times, the final volume was determined. The formula for the foam was as follows: $\text{Foam formation final volume of shampoo} - \text{initial volume}$.,[14]

4. Determination of the viscosity:

The viscosity was determined using a Brookfield viscometer where the spindle speeds were adjusted between 0.3 and 10 rpm³. Spindle T95 was used to measure the viscosity of each shampoo. Both the sample container's size and temperature were kept constant throughout the investigation.,[15]

5. Dirt dispersion test:

Two shampoo drops and ten milliliters of distilled water were combined in a sizable test tube. The test tube was stopped and shaken ten times after adding one drop of India ink to the mixture. The rubric indicated whether there was none, light, moderate, or heavy ink in the foam.[16]

6. Surface tension measurement:

A stalagmometer was used to measure the surface tension of 10% w/v shampoo in distilled water at room temperature. [17]

7. Physical appearance/visual inspection:

Clarity, ability to produce foam, and fluidity of the prepared formulations were assessed.

8. Wetting time:

The canvas was divided into 1-inch-diameter discs, each weighing 0.44 grams on average. The stopwatch was started after the disc floated on the 1% w/v shampoo solution surface. Wetting time is the precise amount of time that the disc needed to start sinking.

9. Rheological evaluations:

The Brookfield Viscometer (Model DV-1 Plus, LV, USA) was used to measure the viscosity of the shampoos. It was adjusted to spindle speeds ranging from 0.3 to 10 rpm³. Spindle T95 was used to measure the shampoos' viscosity. The study maintained constants for both the temperature and the size of the sample container.

10. Cleaning action:

Five grams of wool yarn were soaked in grease, and then they were placed in a flask with 200 milliliters of water and one gram of shampoo. The water was kept at 350 degrees Celsius. For four minutes, 50 shakes per minute were applied to the flask. The sample was taken out, dried, and weighed after the solution was removed. The quantity of grease extracted was computed.

11. Detergency ability:

The detergency ability of the samples was assessed using the Thompson method. In a nutshell, a clump of hair was cleaned with a 5% sodium lauryl sulfate (SLS) solution, dried, and split into three-gram weight groups. A 10% artificial sebum solution in n-hexane was added to the samples, and the mixture

was shaken for fifteen minutes at room temperature. The samples' sebum content was then ascertained after the solvent was removed and allowed to evaporate at room temperature. The samples were then split into two equal portions, one of which washed with 0.1 ml of the 10% test shampoo and used as the negative control. After drying, samples' sebum was removed using 20 milliliters of n-hexane, and the weight was again measured. The percentage of detergency power was then computed.

12. Foaming ability and foam stability:

The ability to foam was assessed using the cylinder shake method. In a 250 ml graduated cylinder, 50 ml of the 1% shampoo solution was added. The cylinder was then covered with a handshake and shaken ten times. After shaking for one minute, the total volumes of the foam contents were noted. Only the volume of foam was calculated. The volume of foam was immediately measured and recorded every minute for four minutes.

13. Skin sensitization test:

Three groups of seven guinea pigs each were created. The hair on the guinea pigs' posteriors was removed the day before the experiment began. Animals in groups were given shampoo treatments on their bare skin. Animals were treated with a standard irritant, a 0.8% v/v aqueous solution of formalin. After applying fresh patches or formalin solution to the animals for up to 72 hours, the same investigator graded the application sites using a visual scoring system. There were four points on the erythema scale: zero, none, one, slight, two, well-defined, three, moderate, and four, scar formation (severe).

14. Eye irritation test:

From the animal house, animals (albino rats) were gathered. Six albino rabbits had their eyes held open with clips at the lid, and 1% shampoo solutions were drip-fed into them. Throughout an average of four seconds, the rabbit's eyes were gradually becoming more damaged. This was noted at predetermined intervals. Hemorrhaging (bleeding), ulceration, swelling of the eyelid, inflammation of the iris, and blindness are possible reactions to the irritants.

15. Surface characterization:

Using scanning electron microscopy (Leo 430, Leo Electron Microscopy Ltd., Cambridge, England), the surface morphology of the hairs was investigated. The hair samples were directly mounted on the SEM sample stub using double-sided sewing tape, and then they were coated with 200 nm thick gold film at 0.001 mm of Hg pressure. For surface characterization, photomicrographs with an appropriate magnification were acquired.

16. Stability studies:

Formulations were placed in glass tubes and kept in a humidity chamber with a temperature of 45°C and a relative humidity of 75% to study their thermal stability. For three months, at one-month intervals, their physical stability and appearance were examined.

17. Visual assessment

The prepared formulation was assessed for color, clarity, odor, and froth content **Surface tension measurement.** A stalagmometer was used at room temperature to measure the surface tension of the shampoo that had been prepared in 10% w/v distilled water. [9].

FUTURE SCOPE:

Given that most of the ingredients are herbal and easily accessible in rural areas, it has a decent chance of becoming a gene-rating occupation in the future. The country's income will rise as there will be more exports than imports.

CONCLUSION:

Creating a shampoo that is entirely herbal and comparable to the synthetic shampoos on the market was the study's main goal. Utilizing plant extracts, which are frequently used in traditional medicine, we created a herbal shampoo. praises throughout Asia for their ability to cleanse hair. As a result, all of the chemicals will used to make shampoo are considerably less likely to cause hair or protein loss during combing than synthetic conditioning agents like silicon dioxide and polyquaterniums. We have achieved the conditioning results by employing plant extracts such as Shekakai, Amla, Ziziphus, and others, rather than cationic conditioners. The physicochemical characteristics of both prepared and commercial shampoos will be assessed and contrasted using a number of assays. In quality control testing, the prepared shampoo will be performed similarly to commercially available shampoo; however, more investigation and development are needed to raise the overall quality of the product.

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