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Research Article

To Formulate and Evaluate Herbal Anti-Dandruff and Scalp Soothing Shampoo

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ABSTRACT

Artificial ingredients found in commercially available (synthetic) shampoos damage hair follicles, irritate the scalp, and have other negative effects. Because they are increasingly aware of the damage that synthetic products may bring to their skin, hair, and eyes, consumers prefer herbal products over synthetic ones. Because they have fewer side effects, herbal products are better than synthetic ones. One kind of cosmetic product manufactured using herbs is herbal shampoo. Its primary purpose is to cleanse the scalp and hair of extra oil, dirt, and dandruff. This study's main objective is to develop and evaluate a polyherbal shampoo made with natural ingredients. The following plants are utilised in the shampoo production process: Shikakai fruit (Acacia concinna), Amla (Emblica officinalis), Reetha (Sapindus mukorossi), Neem leaf (Azadirachta indica), and Hibiscus flower (Hibiscus rosea). Physical appearance, pH, wetting, surface tension, viscosity, foam stability, dirt dispersion, percentage solid content, antibacterial activity, skin irritation, and stability tests were all assessed for the formulations. Studies on the prepared shampoo's stability over a period of one to two months revealed little variations in their evaluation tests.

INTRODUCTION

Most likely, shampoos are utilised as cosmetics. It is a hair care product that we use on a daily basis to clean our hair and scalp. Shampoos are a viscous mixture of detergents with appropriate additions, preservatives, and active substances that are most commonly used as beautifying agents. Typically, damp hair is rubbed with it before being rinsed with water to remove the residue. Shampoo is meant to remove accumulated dirt from hair without removing a significant amount of sebum. There are a lot of synthetic shampoos on the market right now, both medicated and non-medicated, but herbal shampoo has gained

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popularity because it is natural, safer, and has no negative side effects[1-3]. Synthetic surfactants are added to shampoos primarily for their washing and foaming properties, but long-term usage of these surfactants can cause major side effects like dry hair, eye irritation, and scalp discomfort . We can use shampoos with natural herbs as an alternative to synthetic ones. It is quite challenging to create cosmetics with solely natural ingredients, but . Many medicinal plants that may have hair-related benefits have been utilised for many years all over the world and are used in shampoo formulations . These therapeutic plants can be utilised in extracts, powders, crudes, or derivatives [4]. Reetha (Sapindus), Hibiscus, Amala (Phyllanthus emblic), Tulsi (Ocimum tenuiflorum), Shikakai (Acacia concinna), Neem (Azadirachta indica), and Alovera were among the appropriate ingredients included in the formulation of the herbal shampoo used in this study. For ages, a range of herbal medicines, including homoeopathic, Siddha, and Ayurvedic ones, have made use of neem and aloe vera. Dandruff is a major hair problem that causes a lot of public distress in India and around the world. Dandruff, a chronic, non-inflammatory disorder of the scalp characterised by excessive scaling of the scalp tissue, is one of the most common dermatological skin conditions. The fungi that cause dandruff are Malassezia restricta and M.globusa. Malassezia, also known as Pityrosporum, is a yeast that cleanses the skin [5]. Shampoos are mostly found in cosmetic items. Nowadays, the majority of men and women use shampoos, although in the past, individuals would wash their hair with soap cakes. When used as prescribed, a shampoo is a formulation of surfactant in an appropriate liquid, solid, or powder form that cleanses hair of surface oil and debris. Regardless of the kind of water used or the sort of dirt or fat that has to be removed from the hair, a good shampoo can immediately produce a lot of foam. However, most individuals always like shampoos with a lot of froth. As a result, the hairs are too dry to comb or manage. So, it's also crucial to properly condition your hair. Seborrhoea is another anatomical disorder that is characterised by abnormal sebum from the sebaceous gland[6].

MATERIAL AND METHODS:

MATERIALS:

The different parts of the plants were selected for the study having hair care property. The plants are Hibiscus flower (Hibiscus rosea), Neem leaf (Azadirachta indica), Shikakai fruit (Acacia concinna), Aloe leaf (Aloe barbadensis), Amla (Emblica officinalis), Reetha (Sapindus mukorossi).

Table no: 1 The biological source of the herbs used to make shampoo, their use

Sr no	Name of herb	Uses	Image
1	Aloe vera: Aloe is the juice extracted through incision from the undersides of different types of leaves. species of aloe that are members of the Asphodelaceae family.	When used in herbal shampoo, it also lowers inflammation, which helps people who have itchy dandruff. Aloe vera's antifungal and antibacterial qualities can help reduce dandruff, balance the pH of the scalp, and promote hair growth. Aloe vera effectively removed excess sebum and debris from the hair shaft [7].	

2	Neem is made up of dried or fresh leaves and seed oil from Azadirachta indica, which is a member of The Meliaceae family	Add to herbal shampoo. cleans the scalp, unclogs clogged pores, and promotes hair development. It is also very important for treating dandruff. It has antibacterial and restorative qualities and can be used for a number of hair issues. Neem is also useful for treating dandruff. The herbs Amla, Neem, Reetha, and Shikakai are necessary for promoting hair development, according to Ayurveda [8].	
3	Shikakai: It is made out of the fruits of the Leguminosae family plant Acacia concinna.	adds bounce and lustre to lifeless hair, fights dandruff, encourages hair growth, regulates hair loss, and preserves a healthy hair environment. It is used as a conditioner because it contains a lot of saponins and is a natural foaming agent[9].	
4	Reetha is made up of the fruits of the Sapindus mukorossi plant, which is a member of the Sapindaceae family.	keeps the scalp from drying out and has a cooling and great cleansing impact on the skin[10].	
5	Hibiscus: Hibiscus sabdariffa, a flowering plant that is a member of the Meliaceae family,	It contains amino acids, vitamin A, vitamin C, and alpha hydroxyl acids, among other nutrients that are very good for hair and scalp, maintain the scalp healthy, and reduce the likelihood of hair dandruff. It is the most helpful element for hair and is used for hair growth, regrowth, and hair loss[8].	

6	Amla is made up of the fruits of the Emblica-officinalis plant, which is a member of the Phyllanthaceae family.	strengthen the hair and scalp, promote hair growth, lessen hair loss, and stop or cure bacterial and fungal infections of the hair and scalp[11].	

METHODS:

Preparation of Plant Extract:

A computerised balance was used to precisely weigh each herb. The raw herbs were gathered, and each of these components was individually ground into smaller pieces using a hand-held mixer. ground into a fine powder, which was then sieved 120 times. It was then combined with 100 millilitres of distilled water and allowed to boil until the water was reduced to a quarter. The extract was boiled, allowed to cool to room temperature, and then filtered using muslin cloth to obtain the final filtrate [12].

Table no 2: Formulation table of herbal shampoo

Sr no	Ingredients	Quantity	Purpose
1	Neem	1gm	Anti-bacterial
2	Shikakai	1.5gm	Anti-dandruff
3	Reetha	2gm	Foaming agent
4	Hibiscus	1 gm	Stimulates hair growth
5	Amla	2 gm	Strengthens scalp and hair
6	Tulsi	2 gm	Anti-microbial activity
7	Aleovera gel	1.5gm	Nourishing
8	Sodium Hydroxy methyl cellulose	1.5gm	Thickening agent
9	Methyl paraben	0.5gm	Pesrvative
10	Rose oil	few drop	Perfume
11	Water	qs	Vehical

Herbal Shampoo Formulation Procedure:

The formulation involved a precise method to ensure the stability, consistency, and therapeutic efficacy of the final shampoo. The process was as follows:

Powders of Shikakai, Reetha, Amla, Fenugreek, and Hibiscus were combined in equal amounts.

↓

Powdered neem and black sesame seeds were added and thoroughly mixed.

↓

Aloe vera gel was added to the herbal blend, and it was agitated for 15 to 20 minutes.

↓

After heating the mixture on a hot plate, methyl paraben (a preservative) and sodium CMC (a thickening) were added.

↓

Rose water was added for scent once it had cooled.

↓

For assessment, the finished mixture was placed in containers.

Evaluation parameters of Herbal Shampoo:

1. Physical appearance: Consumers typically evaluate shampoos based on their visual appeal, taking note of the formulation's clarity, colour, and fragrance[13].

2. pH: A pH meter was used to measure the shampoo's pH level in a 10% solution at room temperature, which was 252 °C.

3. Dirt dispersion: 10 ml of diluted shampoo and 1 drop of India ink were added to a 1% shampoo solution with water; the test container was then sealed and shook ten times. It was judged that there was none, mild, moderate, or substantial ink in the foam. Shampoos that concentrate the ink in the foam are regarded as being of low quality [14].

4. Foaming ability and stability: The most popular technique for figuring out foaming ability is the cylinder shake method. 50 ml at ambient temperature. A 250 ml graduated cylinder was filled with the shampoo solution, covered by hand, and shook ten times. Following 60 seconds of shaking, the total amount of the foam content was noted. The height of the foam that was produced was measured right away. The same process was used to measure the foam volume after 20 minutes in order to assess foam stability [15].

5. Percentage of solid contents: Four grammes of formulated shampoo were put onto a dry, clean evaporating dish. The total weight of the evaporating dish containing the shampoo was recorded as W_1, and it was then placed on a hot air oven set at 50 °C until the liquid content had completely evaporated. Finally, the cooled evaporating dish containing the solid content was weighed and recorded as W2. The percentage (%) of the solid content was computed as $[(W_1-W_2) \div W_1] \times 100$ [16].

6. Rheological evaluation: The Ostwald viscometer, a capillary viscometer, is used to measure the viscosity of a liquid. The amount of time needed for a liquid to move between two markers (A and B) is measured as it passes through the capillary tube. The time needed for the reference sample, which is typically water, to flow is compared to the time needed for the liquid being tested.

7. Skin Irritation Test: After washing, a prepared polyherbal anti-dandruff shampoo was applied to the skin for five minutes to check for inflammation or irritation[17].

8. Washability: After using shampoo, wash your hands[18].

9. Wetting Time: A substance's wetting time depends on its concentration. Although Drave's test is the official one, the canvas disc method is typically employed because it is simple and time-efficient. The stopwatch began when a disc of smooth-surfaced canvas paper was placed on top of the herbal shampoo solution. The wetting time was defined as the amount of time needed for the disc to start sinking[19].

RESULT AND DISCUSSION:

A number of quality control tests were conducted to assess the created formulation's quality, including testing for conditioning performance, physiochemical control, and visual appearance.

Physical appearance/visual inspection:

The prepared compositions' clarity, brown colour, good odour, ability to produce foam, and fluidity were all assessed.
As a result, the physical characteristics were discovered to be dark brown and foam-producing.

Determination of pH:

Using a pH meter and Litmus paper, the pH of a 10% shampoo solution in distilled water was measured at room temperature (25°C). The pH was discovered to be - 5.80

Fig.1 pH Determination

Washability:

Applying to the skin allows one to manually assess the degree and ease of clean

Fig.2 Washability

Wetting time:

A substance's wetting time depends on its concentration. Although Drave's test is the official one, the canvas disc method is typically employed because it is simple and time-efficient. The stopwatch began when a disc of smooth-surfaced canvas paper was placed on top of the herbal shampoo solution. The wetting time was defined as the amount of time needed for the disc to start sinking. The wetting time was determined to be -2 seconds.

Fig.3 Wetting Time

Determine percentage of solid contents:

To find the percentage of solid contents, four grammes of formulated shampoo were placed on a clean, dry evaporating dish, and the total weight of the dish was recorded as W_1. Then, the evaporating dish was placed in a hot air oven set at 50 °C until the liquid content was completely evaporated, and the cooled evaporating dish containing the solid content was weighed and recorded as W2. The percentage (%) of the solid content was calculated as $[(W_1-W_2) \div W_1] \times 100$. The result showed that the percentage of solid content was – 38%.

Fig.4 - %Solid Content Determination

Dirt Dispersion:

Add two drops of shampoo to ten millilitres of distilled water in a big test tube. Put a drop of India ink in this, cover the test tube with a stopper, and shake it ten times. None, Light, Moderate, or Heavy were used to measure the amount of ink in the foam. The results showed that the amount of ink in the foam was light.

Fig.5 Dirt Dispersion

Foaming ability and foam stability:

Foaming ability was assessed using the cylinder shake method. A 250 ml graduated cylinder was filled with 50 ml of the 1% shampoo solution, then the cylinder was hand-lined and shook ten times. Following a minute of shaking, the total quantities of the foam contents were noted. The volume of foam was only determined right after shaking, and it was recorded for four minutes at one-minute intervals. Outcome: Ability to Foam: 8 ml.

Fig.6 -Foam ability and stability determination

Skin Irritation test:

Tests for skin irritation and eye irritation showed that the herbal shampoo powder had no negative effects on the skin. The lack of artificial surfactants is the cause of this. The majority of synthetic surfactants cause corneal irritation and eyelid inflammation. However, all of the constituents in this herbal shampoo powder composition have natural purposes. Therefore, it has no negative impact on the outcome. It didn't irritate.

Fig.7 Skin Irritation Test

Rheological Evaluation:

The Ostwald Viscometer, A Capillary Viscometer, Is Used To Measure The Viscosity Of A Liquid. The Amount Of Time Needed For A Liquid To Move Between Two Markers (A And B) Is Measured As It Passes Through The Capillary Tube. The Time Needed For The Reference Sample, Which Is Typically Water, To Flow Is Compared To The Time Needed For The Liquid Being Tested. The Viscosity Was Determined To Be 3.84 Cp.

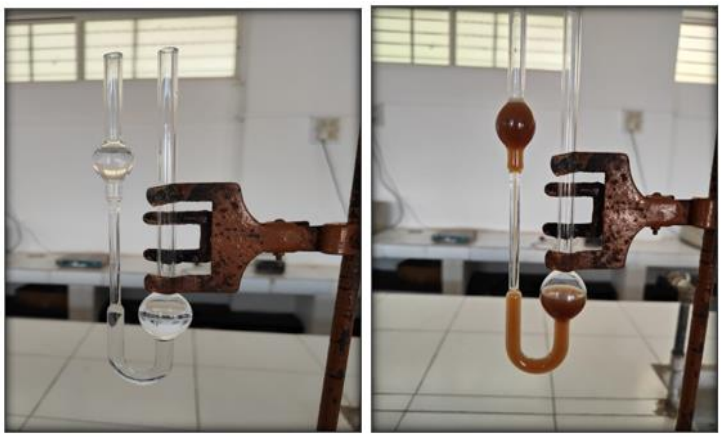

Fig.8 Wetting Time Determination

CONCLUSION:

Herbal shampoos are concoctions that are used to cleanse and wash hair while also nourishing it. Because they contain only natural or herbal ingredients rather than artificial chemicals, herbal shampoos are popular because they have less or no negative effects than conventional shampoos. Herbal shampoo is safe for the environment and your skin, and it doesn't involve animal testing. The different herbal ingredients were used in the formulation of the herbal liquid shampoo. Overall, the results indicated a pH that was neutral and non-irritating to the skin. Appearance, washability, non-irritating properties, foam stability, dirt dispersion activity, antimicrobial activity, and rheological and surface tension tests all yielded positive results in evaluation trials.

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