



“FORMULATION AND EVALUATION OF ANTIDANDRUFF HERBAL SHAMPOO”

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Abstract

The purpose of the current study is to develop and assess an anti-dandruff shampoo that uses natural ingredients, with a focus on its efficacy and safety. It eliminates dandruff and dust, encourages hair development, and darkens the hair. The anti-dandruff extract from Hibiscus leaf, Neem leaf, Betel leaf, orange peel, amla powder, and Aloe Vera leaf is combined in various ratios to create the shampoo. For disfigurement assessment, wetting time, pH measurement, viscosity, assurance of solid content, surface tension, dirt dispersion, conditioning performance, and foam stability, a number of physical and chemical tests were conducted. The designed anti-dandruff shampoo has a brown colour, a low surface tension, an ideal pH, and conditioning activity that can be seen in the froth stability and cleaning ability. These are all the qualities that a high-quality anti-dandruff shampoo should have.

Keywords

Antidandruff, Natural Ingredient, hair care, Natural Plants, Surfactant, Synthetic Shampoos, Hibiscus rosa-sinensis, Evaluation of Shampoo, Natural and Healthy.

1.) Introduction

1.1 Introduction of Herbal Shampoo

Since the beginning of time, people have used herbs for cleaning, beautifying, and managing their hair, but as people are becoming more aware of their negative effects on their skin, eyes, and hair, they are turning away from these methods in favor of the above-mentioned products because they are less expensive and have fewer drawbacks. These products are also preferred by the community because they are important for maintaining hair manageability and oiliness.^[1]

There are many different kinds of shampoos, including powder, clear liquid, lotion, solid gel, medicinal liquid, herbal liquid, and more. Regarding herbal shampoo, they may be simple or plain shampoo, antibacterial or anti-dandruff shampoo, or nutritious shampoo including vitamins, amino acids, and protein hydrolysate, depending on the nature of the component.^[2]

Shampoo: A shampoo is a preparation of a surfactant (i.e., surface active substance) in an appropriate form, such as liquid, solid, or powder, that when used as directed will remove surface grease, dirt, and skin debris from the hair shaft and scalp without having an unfavorable effect on the user.^[3]

Herbal Shampoo: Like conventional shampoo, herbal shampoo is a cosmetic preparation that uses herbs derived from plants and is used to wash the hair and scalp.

Ideal Characters of Shampoo: ^[4]

1. Dust and excessive sebum should be fully and properly removed.
2. Should thoroughly cleanse hair.
3. Should generate a large volume of foam.
4. Shampoo needs to be easily eliminated with water by rising with water.
5. Should not dry out the hair and should be silky, shiny, and manageable.
6. Should not be too difficult to handle while still being good.
7. Shouldn't dry out and chap the hand.
8. Should not irritate the skin or eyes, nor should it have any negative side effects.

1.2 Types of Shampoo

Shampoos are of the following types-

- a. Powder Shampoo
- b. Liquid Shampoo
- c. Lotion Shampoo
- d. Cream Shampoo
- e. Jelly Shampoo
- f. Aerosol Shampoo
- g. Specialized Shampoo
- h. Conditioning Shampoo
- i. Anti-dandruff Shampoo
- j. Baby Shampoo
- k. Two Layer Shampoo

1.3 Composition of General Shampoo:-^[4]

- 1) SURFACTANT
- 2) CONDITIONING AGENT
- 3) THICKENING AGENT
- 4) COLOURING, PERFUMING AND PRESERVATIVE

1). SURFACTANT

Shampoo's primary ingredient is surfactants. Ammonic surfactants predominate. The following are the raw components needed to make shampoos:

Principle surfactants: Provide detergency and foam.

Secondary surfactants: Improve detergency, foam and hair condition.

Antoine surfactants: - Are mostly used (good forming properties)

With its negative charge, the hydrophilic component produces improved foaming, cleaning, and outcome qualities.

Non-ionic surfactants offer good cleaning capabilities, but our ability to produce foam is insufficient.

Cationic surfactants are poisonous and hence not used, but they may be used in hair conditioners at low concentrations. Ampholytics are typically not used since they are pricey. They do make excellent hair conditioners and secondary surfactants, though.

E.g. REETHA AND SHIKAKAI.

2) CONDITIONING AGENT:-

In some instances, it is also known as moisturizing, and they typically include a variety of oils and lubricants. Coating the substrate to mimic their feel and appearance is one way to employ them. Certain substances are used as conditioners in natural shampoo.

E.g. ALOE-VERA HERBAL EXTRACTS.

3) THICKENING AGENT:-

These substances are polymers that function by soaking up water to expand and become more viscous. In herbal shampoo, there is a thickener –

E.g. SODIUM CARBOXY METHYL CELLULOSE

4) COLOURS, PERFUMES AND PRESERVATIVE:-

The chemical added to affect the color of a composition is a coloring agent. The substances that disseminate or impart an alluring or pleasant smell are known as perfuming agents. In order to protect the formulation against bacteria and undesired chemical reactions, preservatives are compounds that are added.

E.g. PROPYL PARABEN, ORANGE PEEL OIL

Applications

- A quality shampoo shouldn't strip too much of the scalp's natural oil while completely cleansing the hair and scalp without leaving any stains or rashes.
- The shampoo must transmit luster, beauty, and manageability in addition to being a detergent and cosmetic. This is how it will succeed in replacing a cake of soap.

2.) **Aim and Objective** – The objective of this research is to develop and evaluate a natural anti-dandruff shampoo that successfully cleanses hair while also naturally nourishing it and promoting the development of strong, healthy hair. Additionally, it aims to assess the shampoo's physicochemical performance with a focus on safety, efficacy, and the substitution of potentially dangerous synthetic ingredients with safe natural ones. The objective of this research is to produce a herbal shampoo using natural ingredients that have historically been used to cure hair, such as Aloe Vera, Neem, Reetha, Betel leaf, Orange Peel, and Hibiscus. Testing the shampoo's capacity to fully cleanse hair, get rid of specific oil and impurities, and promote hair development is crucial.

3.) Material and Methods

2.1 The plant materials used in formulation are

- A. Hibiscus Leaf
- B. Betel leaf

- C. Aloe Vera
- D. Neem
- E. Reetha
- F. Orange Peel

A. Hibiscus Leaf

Common name: Roselle or Jamaican sorrel

Biological source: Dried leaf exact origin of Hibiscus rosa-sinensis.

Family: Malvaceae

Chemical constituents: leaf contains, Polyphenols, Quercetin, Flavonoids

Uses: - Antidandruff, Narrating Hair, Dry hair, Privation hair fall, restore and new growth hair.

B. Betel leaf^[3,6]

Common name: - Pan patta, Betel, Tambula.

Biological source: - Dred leaf of the plant Piper betel

Family:-Piperaceac

Chemical constituents:- leaf contains, Beta sitosterol, Starch, sugars, tannin., diastases (0.8-1.8%) & essential oil

Uses: - Analgesic, Indigestion, Anti-oxidants, Antifungal, Anti-hair fall

C. Aloe Vera: ^{-[7]}

Common Name: - Ghrita, Kumari & korphad musabbar

Biological Source: - Dried juice of leaves of Aloe barbadensis miller, Aloe Perry baker.

Family: - Liliaceae

Chemical constituents:- Aloe-emodin, Barbaloin. isobarhaloin,, B-barbalaim,, Resins

Aroetic acid, homonataloin, aloesone chrysophanic acid, chrysamminic acid, galactouronic acid, saponins.

Uses:- Purgative, Ant-inflammatory, Treatment of bums & itching

Uses in skin Cosmetics as a protective due to its anti-wrinkle properties.

D. Neem: - ^[7]

Common Name: - Margosa

Biological source: -Consist of all aerial of part of plant known as Azadwachts

indica

Family: - Meliaceae

Chemical constituents:-Diterpenes (sugiol, nimboil), Triterpenes: - B-sitosterol, stigma sterol

Limonoids: -Meliantriol, Nimbidinine,

Nimbendiol, azadirachtin.

Uses:- Antimicrobial, Insect Repellent, Insecticide

E. Reetha:- [8]

Common name | Washout. SOEPNUL. seaberry

Biological Source:-It is dried (runt of PlaM Nuprenties mukerness

Family:- Sapindaceae

Chemical constituents:- Reetha mainly contain saponins = (10% 11 \$), Supar (10°s) & mucilage, Triterpenes, St sapindoside (sapindoside A, B, C.D, & mukorossi saponins (E1 & Y1)

Uses:- Used to shining hair, Used for curing hairs issue, Natural Cleanser, Detergent foaming property.

F. Orange Peel:-

Common name - Orange peel

Biological Source It consists of a fruits of fruits of citrus sinensis.

Family- Rutaceae

Chemical constituents: Terpenes such as carveol, carvone, Menthol, Perillyl, alcohol and Perillaldehyde. Menthol, Perit

Uses: Used for making perfume and soap.

2.2 Preparation of Herbal Shampoo

Each plant was taken from an authorized herbal garden, identified, and authenticated by a botanist. Plant parts were removed and stored according to protocol. The extraction process was carried out in accordance with protocol.

Preparation of hibiscus leaf Exstraction.

Water extract: In a conical flask, 10 g of powdered leaves were immersed in some distilled water. The leaf powder was soaked for an hour, 100 ml of water was added, and it was left to macerate for 7 days with periodic shaking. After a week, the liquid was filtered using filter paper, and leaf extract was squeezed out of the marc to release more menstrual fluid. After mixing the two extracts, the liquid evaporated to produce an aqueous extract with a green hue.



Figure. 1 Maceration of Hibiscus leaf



Figure 2. Filtration Process of Hibiscus Leaf



Figure 3. Extract of Hibiscus Leaf

Extraction was done by decoction Method –

- 1 50 ml of water and one 50 gm fresh leaf of Azadirachta indica were boiled together before being strained.
- 2 150 ml of water were heated with 100 gm of dried spindus mokorossi seed powder before filtering.
- 3 50 ml of water were used to extract 10 gm of aloe.
- 4 To create a solvent, dried piper betel leaf was cooked in 150 ml of water. It was then filtered.
- 5 First, a base was made by combining 10 grammes of sodium carboxymethyl cellulose with 90 millilitres of water and stirring until the base became thick.
- 6 500 ml beaker was taken.
- 7 Stirred together 100 ml of the hibiscus leaf extraction and 100 ml of the Reetha extraction.
- 8 100 ml of Betel leaf extraction was added.
- 9 Added were 25 ml of aloe Vera extraction and 25 ml of neem extraction.
- 10 As a preservative, 100 ml of propyl paraben was added.
- 11 For 15 minutes, the above extraction was agitated.
- 12 As a perfuming agent, 11–15 ml of orange peel extract was added and mixed for 5 min.
- 13 A 500 ml plastic bottle was used to hold the shampoo after it had been produced.

TABLE NO. 1:- ROLE OF INGRIDIENS

Sr. No	NAME OF INGRIDIANT	ROLE OF INGRIDIENT
1	BIBISCUS LEAF	ANTIDANDRUFF
2	BETEL LEAF	ANTIHAIRE ALL
3	ALOE VERA	CONDITIONING AGENT
4	NEEM	ANTIBACTERIAL
5	REETHA	FOAMING AGENT
6	ORANGE PEEL	PERFUMING AGENT
7	PROPYL PARABEN	PRESERVATIVE
8	SODIUM CARBOXY METHYL CELLULOSE	THICKENING AGENT
9	WATER	VERBCLE

In the formulation no. 1 the viscosity was very less.

Table No. 2:- FORMULATION No. 1 (F1):- FOR 500 ML

Sr. No	NAME OF INGRIDIAN	Quantity
1	BETEL LEAF EXTRACT	100 ML
2	NEEM EXTRACT	500 ML
3	HIBISCUS EXTRACT	100 ML
4	REETHA EXTRACT	100 ML
5	ALOE VERA EXTRACT	100 ML
6	ORANGE PEEL EXTRACT	100 ML

In the formulation no. 2, sodium carboxy methyl cellulose was added to increase its viscosity.

Table No. 3:- FORMULATION No.2 (F2):- for 500 ml

Sr. No	Name of Ingredient	Quantity
1	BETEL LEAF EXTRACT	100 ml
2	SHIKAKATH EXTRACT	100 ml
3	REETHA EXTRACT	100 ml
4	NEEM EXTRACT	25 ml
5	ALOE VERA EXTRACT	25 ml
6	PROPYL PARABEN	10 ml
7	SODIUM CARBOXY METHYL CELLULOSE	100 ml
8	ORANGE PEEL OIL	15 ml
9	WATER	27 ml

2.3 Evaluation parameter: - ^[12]

The two formulations were evaluated by following parameters.

- 1 Physical appearance:** - The color (Brownest), smell (slight), and appearance of the created formulation were assessed.
- 2 Dirt dispersion:** -^[13] 10ml of purified water and two drops of shampoo were put to a big test tube. A millilitre of distilled water from India. The test was shaken ten times and 1ml of India ink was added. None, Light, Moderate, or Heavy were the estimated ink concentrations in the foam.
- 3 Wetting time test:** - ^[14] One-inch-diameter discs of canvas paper with an average weight of 0.449 were cut into the paper. After placing the disc's smooth surface over the herbal shampoo solution, the stopwatch was activated. The wetting time was recorded as the amount of time needed for the disc to start sinking.

- 4 Foam ability and foam stability:** ^[15] We briefly applied the cylinder shaking method to assess foaming capacity. A graduated cylinder with a capacity of 250 ml was filled with 50 ml of the herbal shampoo solution. With one hand covering it, 10 times the entire volume of the form's contents were measured after one minute of shaking.

By measuring the form volume after the shake test for one minute and four minutes, form stability was determined.

5 Detergency and cleaning action:-

- a. Evolution using the Bennet and Powers approach is purifying power.
- b. A single 5 grams sample of human hair is deposited in 200 cc of water with 1 gram of shampoo at 35 degrees Celsius.
- c. The flask is pumped 50 times per minute for a minute, emptied again with enough water, and after filtering the hair, it is weighted and dried.
- d. Under these circumstances, the quantity of soil removed is calculated.

6 Determination of PH

The measurement of syrup's pH using two methods-

Glass electrode

Procedure

- 1 Turn on the instrument after filling the input socket with water and connecting the combination pH electrode.
- 2 Apply a 7 pH buffer solution to the electrode.
- 3 The buffer solution should be the temperature setting.
- 4 Set the function selector switch to pH and continue to calibrate the control until the digital display accurately displays the buffer solution's precise PH value.
- 5 Put the function selector switch on standby at this point.
- 6 Discard the buffer solution and wash the electrode with distilled or ionized water.
- 7 Wash the combination electrode with distilled or ionized water after dipping it in the buffer solution.
- 8 Set the temperature control to the chosen buffer solution's temperature.
- 9 When the pH position is selected, the front-panel slope control can be adjusted until the pH value of the chosen buffer solution is displayed on the display. This allows you to verify that the right reading was achieved with both buffer solutions.

7 Viscosity

Procedure

- 1 Use warm chronic acid to thoroughly clean the Ostwald viscometer, and organic solvents like acetone if necessary.
- 2 Place the viscometer vertically on the proper stand.
- 3 Fill the dry viscometer with water to Mark G.
- 4 Count the number of seconds needed for water to flow from point A to point B.
- 5 To get an accurate reading, repeat step 3 at least three times.
- 6 Fill the mark A of the Ringse viscometer with the test liquid, and then fill it to the mark B to determine how long it takes for the liquid to flow.
- 7 Calculating the liquid's density in accordance with the experiment for calculating density.

Formula

Viscosity = density of test liquid time required for test liquid density of water time required to flow water.

- 8 Density: - It is defined as it is a ration of mass per volume.

Procedure:

- 1) Use either nitric acid or sulfuric acid to thoroughly clean the specific gravity bottle.
- 2) Rinse the bottle with
- 3) If required, rinse the
- 4) Take the capillary tube stopper off an empty, dry bottle and weigh it.
- 5) Fill the bottle with the unknown liquid, secure the cork, and use tissue paper to wipe away any extra liquid that may have seeped outside the tube.
- 6) On an analytical balance, weigh a bottle containing an unknown liquid.(w2)
- 7) Calculate the liquid's weight in grams. (w3)

Figure 3. Wetting time test

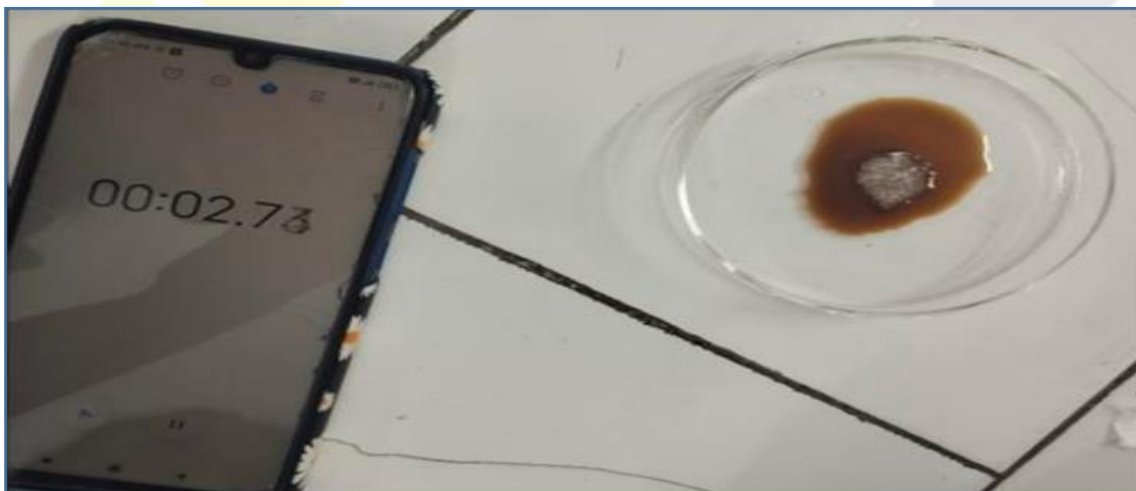
Formula: Density of unknown liquid = Weight of unknown liquid/volume of unknown liquid = w/v.



1) Physical appearance

Figure 1 colored of the prepared Shampoo

2) Wetting time test



3) Foam Ability



Figure 3 Foam Ability

4) Density Test



4.) Result

Table no. 4: Result of evolution paran Figure No. 5

Sr. no	Parameters	F1	F2
1	Viscosity	15.223 cp	19.62 cp
2	Density	1.04 gm/ml	1.044 gm/ml
3	Ph Determination	4.21	4.87
4	Dirt Dispersion	Moderate	Heavy
5	Wetting Test	37 sec	56 sec
6	Detergency and Cleaning	Good	Good
7	Foam Ability	124 ml	78 ml
8	Physical Appearance		
	1 Colour	Brown	Brown
	2 Odour	Pleasant	Pleasant
	3 Appearance	Smooth	Smooth
	4 Foam Ability	Good	Good

5.) Conclusion

The numerous herbal ingredients were used to create the herbal liquid shampoo. According to the overall findings, the herbal shampoo formulation 2(F2) was more stable than other formulations based on their evolution factors.

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