



# Formulation and Characterization of Herbal Shampoo: A Review Article

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## Abstract:

The purpose of this review is to gather information related to herbal shampoo. In day-to-day life hair care is of prime importance. A good care of hairs can be taken by use of different cosmetic products like hair oil, hair shampoo, hair gel, hair serum, hair cream etc. For cleansing and nourishing purpose shampoos are widely used by many people as it contains cleansing agents. But with this many chemicals are also involved which may damage health of hairs by continuous use. To encounter this herbal shampoo can be used which make less damage to hairs by giving good results as it contains natural ingredients.

Many herbal crude drugs are used in shampoo formulation like moringa, aloe vera, shikakai, amla, reetha, sidr fruit, hibiscus, olive leaves, soap nut, bhringraj, senna, liquorice etc.

These drugs are used in formulation by taking its aqueous or alcoholic extract with other natural or synthetic excipients. These formulations of shampoo with one or more herbs can be characterized by different methods like pH, percent of Solids, Foam formation: (Shake Test), Foam quality and retention, Surface tension, Skin irritation test, Visual stability, Viscosity, Dirt dispersion test, Visual assessment, Estimation of conditioning performance, Microbial control assessment, Microbial limits test, etc.

The main object of this present study is to prepare and evaluate an herbal shampoo and determine physiochemical function that emphasizes on safety, efficacy and quality of the product.

**Keywords:** Herbal Shampoo; Moringa Olifera; Liquorice extract; Olive Extract; Sidr Extract

## Introduction:

Hair cosmetics are an important tool that helps to increase patient's adherence to alopecia and scalp treatments. Shampoos are not only scalp cleaners, but indubitably act as preventing the hair shaft damage. Many scalp diseases are also treated by active ingredients that are added to the shampoo's formulations. It is desirable that whatever may the disease or condition be (dermatitis, seborrhea, alopecia, psoriasis), the hair strands are kept aesthetically presentable, preserving its softness, combability and shine while treating the scalp.

Shampoos are typically composed of 10–30 ingredients although products with as few as four ingredients are available. The products are grouped into: (1) Cleansing agents; (2) additives that contribute to the stability and comfort of the product; (3) conditioning agents, intended to impart softness and gloss, to reduce flyaway and to enhance disentangling facility, and (4) special care ingredients, designated to treat specific problems, such as dandruff and greasy hair. <sup>1</sup>

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. 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. <sup>2</sup>

Synthetic shampoos have toxic chemical agents like chemicals such as parabens and sodium lauryl sulfate which damage the hair. To combat this issue, the use of natural herbal shampoos, as opposed to synthetic shampoos, is becoming increasingly popular. <sup>3</sup>

## Formulation:

### 1. Formulation of MORINGA HERBAL SHAMPOO

**Plants:** The plant materials required for the present study was obtained

**Material:** - Drumstick pulp has taken with hibiscus flower and some amount of aloe vera and rose water, guar gum, SLS is added.

**Preparation of Extraction:** Every herbal plant of different amount namely M. Oleifera, H. Rosa-sinesis was boiled with some amount of water. Wait for some time cool it and filter it.

**Preparation Of Formulation:** Formulation of herbal shampoo was done as per formula

Weigh accurate amount of ingredients in beaker i.e., Extract of Moringa, Hibiscus and Aloe vera, guar gum, SLS.

Then add some amount of rose water. Stir well until lumps get disappear.

#### Formulation Table:

Sr. No.	Ingredients	Quantity
1	Moringaoliefera	2ml
2	Aloe vera	2ml
3	Hibiscus	1ml
4	Guar gum	0.05gm
5	SLS	0.25gm
6	Rose water	3ml

**Stability-Stability studies:** Stability studies were carried out by placing glass tubes and in humidity chamber at 45°C and 75% relative humidity. And their appearance, physical stability were inspected for a period of 3 months at interval of one month. <sup>4</sup>

### 2. Formulation of OLIVE LEAVES EXTRACT (Family Shampoo):

#### Olive leaves extract clear shampoo:

For the preparation of the shampoos, all ingredients were mixed together according to the formulas shown in the table, and then olive leaves extract was added with a concentration of (1% w/w).<sup>5</sup>

Sr. No.	Chemicals	Quantity
1	CocamidopropylBetaine	3.50%
2	Cocamide DEA	5.50%
3	Sodium laureth ether sulphate	7.50%
4	Sodium lauryl sulphate	3.50%
5	Polyquaternium 7	1.50%
6	Perfume	0.20%
7	Citric acid	0.15%

8	Preservative	0.02%
9	Benzophenone-4	0.10%
10	Olive leaves extract	1.0%
11	Water	77.0%

### 3. Formulation of SHIKAKAI HERBAL SHAMPOO:

Sr. No.	Material	Quantity
1	Reetha extract	2.5 g
2	Amla extract	2.5 g
3	Sheekakai extract	2.5 g
4	Sidr extract	2 g
5	Lemon juice	1 mL
6	Methyl paraben	1 mL of 0.05% solution
7	Gelatin solution	q.s
8	Citric acid	q.s.
9	Essential oil	0.1 mL

#### Procedure:

The plant extracts were mixed in different proportions to obtain a shampoo whose formula is shown in Table 1. Herbal extracts were added to 10% gelatin solution and were mixed by shaking for 20 min. Lemon juice (1 mL) and Methyl paraben were also added with stirring. Finally the pH of the solution was adjusted by adding sufficient quantity of 1% citric acid solution. Few drops of rose essential oil were also added to impart aroma to the prepared shampoo and the final volume was made to 100 mL with gelatin solution. <sup>6</sup>

#### 4. Formulation of HERBAL SHAMPOO:

Formulation of the herbal shampoo was done as per the formula given in Table. To the gelatin solution (10%), added the herbal extract and mixed by shaking continuously at the time interval of 20 min. 1 ml of lemon juice was also added with constant stirring. To improve aroma in the formulation, sufficient quantity of essential oil (rose oil) was added and made up the volume to 100 ml with gelatin. <sup>7</sup>

Table: Ingredients of the herbal shampoo

Sr. No	Materials required	Quantity to be weighed
1	Soap nut extract	0.5 g
2	Amla extract	0.5 g
3	Shikakai extract	0.5 g
4	Hibiscus	0.5 g
5	Bhringraj extract	0.5 g
6	Senna extract	0.5 g
7	Aloe vera	1 g
8	Gelatin	q.s
9	Lemon juice	q.s
10	Rose oil	q.s

**Characterization of Herbal Shampoo:****1. pH:**

1% shampoo solution was used to determine the pH by using the pH meter.

**2. Percent of Solids:**

Weighed a clean dry evaporating dish and recorded the initial weight of evaporating dish. 4Gm of shampoo formulation (not the 1% solution) was taken in the evaporating dish. Weigh the dish and shampoo and record initial weight of shampoo and dish. Calculated the exact weight of the shampoo only and recorded the initial weight of shampoo only. Put the evaporating dish with shampoo on the hot plate until the liquid portion has evaporated. After drying, weighed the dish and shampoo solids and results were noted.

**3. Foam formation: (Shake Test)**

Took 50 ml of the 1% shampoo solution in 250 ml graduated cylinder and recorded the volume. Then cover the cylinder with hand and shaken 10 times. The total volume of the contents was recorded after shaking. Calculate the volume of the foam and recorded the size of the bubbles.

**4. Foam quality and retention:**

Immediately after the shake test, time was recorded. Recorded the volume of foam at 1 minute intervals for 5 minutes.

**5. Surface tension:**

Prepared 1% v/v solution of shampoo by mixing 2ml (40drops) of shampoo with 200 ml of distilled water. The shampoo was taken in the beaker and then slowly added distilled water. After thorough mixing of shampoo and water the surface tension was measured by using stalagmometer.

**6. Skin irritation test:**

Apply the solution of prepared shampoo on skin and kept for 5 minutes and observed for redness of skin and irritation there, were no any red colouration and the irritation to the skin.

**7. Visual stability:**

The prepared shampoo was tested for the visual stability for 21 days at room temperature with relative humidity 65+\_5, and observed for color change and pH. There were no changed in color and pH of shampoo within 21 days and no any phase separation between oil and water.

**8. Viscosity:**

Viscosity was determined by using the Ostwald viscometer. <sup>8</sup>

**10. Dirt dispersion test:**

To 10 ml of refined water two drops of cleanser were included and taken in a wide-mouthed test tube. To the formulated shampoo, added one drop of Indian ink and shaken for 10 min after closing the test tube with a stopper. The volume of ink in the froth was measured and the result was graded in terms of none, slight, medium, or heavy Testing of wetting-Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.44 g was cut into a disc of diameter measuring 1-inch. Over the shampoo

(1% v/v) surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch.

### 11. Visual assessment:

The prepared formulation was assessed for color, clarity, odor, and froth content. <sup>9</sup>

### 12. Estimation of conditioning performance:

To evaluate the conditioning effect of the optimized polyherbal shampoo (F4) and compare its effect with the commercial shampoo, a hair tress of an Egyptian woman was obtained from a local beauty salon. The hair tress was cut into three swatches that were approximately 5cm in length. One part remained unwashed, which served as control (unwashed), whereas the other two swatches were washed with the optimized polyherbal shampoo formulation (F4) and commercial shampoo. Twenty-five randomly selected female volunteers evaluated the conditioning performance of the tested shampoos based on the smoothness and softness using a blind touch test. All blindfolded women were asked to rank the conditioning performance of the three hair tresses after touching them. For rating, scores from \* to \*\*\*\* were used, where, \* = poor, \*\* = satisfactory, \*\*\* = good, and \*\*\*\* = excellent.

### 13. Microbial control assessment:

Soybean-casein Digest Agar Medium (SCDA) was used for preliminary evaluation of microorganisms. Microbial suspension was also prepared at concentrations of 10<sup>5</sup> and 10<sup>8</sup> for strains of *Candida albicans*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus* a sample of shampoo was diluted with SCDA at a ratio of 1:10; then 1 ml of the prepared diluted solution and 9 ml of SCDA was added into four test tubes. 0.1 ml of each microbial suspension was added individually to one of the pertinent test tubes. The test tubes were sealed, shaken, and kept at a temperature of 37°C for 24 h.

### 14. Microbial limits test:

This test was carried out based on plate count method: 1 ml of 1:10, 1:20, 1:30, 1:40, and 1:50 of diluted licorice shampoo was added separately into five test tubes containing 9 ml of SCDA. Then 1 ml of the mixture of each test tube was put on a plate, and added by 15 ml of nutrient-agar and melt agar then kept in an incubator for 24 h.

Antimicrobial preservative effectiveness test 20 ml of licorice shampoo and 0.1 ml of each microbial suspension were added to individual pertinent test tubes and kept at room temperature for 7, 14, 21, 28 (and 35 for *C. albicans*) days. 1 ml of the contents from each tube was taken in two sterile plates and then 15–20 ml of 40°C melt soybean-casein digest agar was added to it. After solidifying, they were kept at 37°C for 24 h. [21]

Evaluation of consumer satisfaction

The study protocol was approved by the Institutional Ethical Committee (Nom: 78.5) at Shiraz University of Medical Sciences. The licorice shampoo was given to 50 volunteers to be used for 30 days. The volunteers were aged 25–35, living locally, instructed on shampoo usage, and recommended not to use any other shampoos during the trial period; at the end of the trial, the volunteers were asked to fill up a questionnaire. The questionnaire was designed to comprise several aspects related to the shampoo, and it included questions on the quality of shampoo, effect on hair style, hair loss, scalp, and eye irritation. The consumers were also asked about the impact

of shampoo on inducing or revealing hair complications including itching, dandruff, trichoptilosis, and spout. Furthermore, the consumers were asked to rate different aspects of the shampoo as excellent, good, or bad. <sup>11</sup>

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