WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 8, Issue 7, 1272-1279. Research Article ISSN 2277– 7105

FORMULATION AND EVALUATION OF LIQUID HERBAL SHAMPOO

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Article Received on
05 April 2019,

Revised on 24 April 2019,
Accepted on 16 May 2019

DOI: 10.20959/wjpr20197-14999

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ABSTRACT

Herbal Shampoo is a cosmetic preparation which uses herbs and it is meant for washing of hair and scalp just like a regular shampoo. The herbal shampoo was formulated using natural ingredients like *Piper betel* (Betel leaf), *Azadirachta indica* (Neem), *Acacia concinna* (Shikakai), *Spindus mokorossi* (Reetha), *Aloe barbadensis* (Aloevera). The formulation at laboratory scale was done and evaluated for number of parameter to ensure its safety and efficacy. Two formulations were prepared i.e. F1 and F2 and the evaluation parameter was studied like Physical appearance, Foam stability, Wetting test, etc. Formulation-2 has shown good viscosity, wetting ability, good physical appearance as compared to other formulations.

KEYWORDS: Herbal Shampoo, Betel leaf, Neem, Shikakai, Reetha, Evaluation.

INRODUCTION

Hairs are the integral part of human beauty. People are using herbs for cleaning, beautifying and managing hair since the ancient times. These reasons attracted community towards the herbal products, which are less expensive and have negligible side effects. It does not only have hair cleansing purpose but also imparts gloss to hair and used to maintain their manageability and oiliness of hair.[1]

Shampoo

A shampoo is preparation of a Surfactant (i.e. surface active material) in a suitable from-liquid, solid of powder -which when used under the specified condition will remove surface grease, direction, and skin debris from the hair shaft & scalp without adversely affecting the user.

Herbal shampoo: Herbal shampoo is a cosmetic preparation which uses herbs and it is meant for washing of hair and scalp just like regular shampoo.[2]

Introduction to ingredients used in preparation

1. Betel leaf: It is commonly known asPan Patta, Betel, and Tambula. It isdried leaf of the plant *Piper betel* belonging tofamily Piperaceae. The leaves contain Beta sitosterol, Starch, sugars, tannin, diastases (0.8-1.8%) and essential oil. The leaves are used as analgesic, digestive; anti-oxidants, antifungal, and as anti-hair fall.[3,4]

2. Aloe Vera: It is commonly known as Ghrita Kumari, Korphad and Musabbar. It is dried juice of leaves of *Aloe barbadensis* miller belonging to family Liliaceae. The juice contains Aloe-emodin, barbaloin, isobarbaloin, B-barbaloin, resins, Aloetic acid, homonataloin, aloes one chrysophanic acid, chrysamminic acid, galactouronic acid, saponins. The juice is used as Purgative, Anti-inflammatory, Treatment of burns a itching and uses in skin cosmetics as a protective due to its anti-wrinkle properties.[5]

3. Neem: It is commonly known as Margosa. It Consist of all aerial part of plant known as *Azadirachta indica* belonging to family Meliaceae. The plant contains Diterpenes (sugiol, nimboil) Triterpenes:- B-sitosterol, stigma sterol, Limonoids:-Meliantriol, Nimbidinine, Nimbendiol, azadirachtin**.** The plant is used as Antimicrobial, Insect Repellant, Insecticide, and Antibacterial.[5]

4. Reetha: It is commonly known as Washnut, soapnut, soapberry. It is dried fruit of plant *Sapindus mokorossi* belonging to family Sapindaceae. The fruit containsmainly saponins (10%-11.5%), Sugar (10%) & mucilage, Triterpenes, Six sapindoside (sapindoside A, B, C, D) & mukorossi saponins (E1 &Y1). The fruit is used for shining hair, curing hair issue, Natural cleanser, Detergent foaming property.

5. Shikakai: It is commonly known as Shikakai, soap-pod. It is dried seed of plant *Acacia rugate* belonging to family Leguminoceae. The seed extract contains lupeol, spinasterol,

acacic acid, lactone & the natural sugar glucose, arabinose & rhamnose. It is also contains hexacosanol, spinasterrone, oxalic acid, tartaric acid, citric acid, succinic acid, ascorbic acid, nicotine. It is used an Ayurveda medicinal plant, traditionally used in shampoo and used in a detergent.[6]

6. Orange peel: Itis commonly known as Orange peel. It consists of a fruit of *Citrus sinensis* belonging tofamily Rutaceae.It contains Terpenes such as Carveol, Carvone, Menthol, Perillyl alcohol and Perillaldehyde. Orange peel is used for making perfume and soap.[12]

MATERIALS AND METHODS

Preparation of extracts: All the five plants were taken for extraction by following methods.

1.100gm pieces of fresh leaves of *Piper betel* were boiled in 150ml of water and filtered.

2.100gm powder of dried fruits of *Acacia concinna* (Shikakai) was boiled in 150ml of water and filtered.

3.25 ml of juice of *Aloe barbadensis* (Aloe) was removed from leaves.

4.50gm fresh pieces of leaves of *Azadirachta indica* (Neem) were boiled in 50ml of water and filtered.

5.100 gm powder of dried fruits of *Spindus mokorossi* (Reetha) was boiled in 150 ml of water and filtered.

Preparation of herbal shampoo

1. Firstly a base was prepared by using 10gm sodium carboxy methyl cellulose in 90ml water and stirred to get thick form.

2. To 500 ml beaker 100 ml of Reetha extract and 100ml of Shikakai extract was mixed and stirred well.

3. Then 100 ml of Betel leaf extract was added.

4.25 ml of Neem extract and 50 ml of Aloevera extract was added.

5.10 ml of propyl paraben was added as a preservative.

6.Above extract was stirred for 15 min.

7.15 ml of orange peel extract was added as a perfuming agent and stirred for 5 min.

8.The shampoo was prepared and placed into a 500 ml plastic container (bottle).

Table. 1: Composition of formulation1 (F1).

Sr. No	Name of ingredients	Quantity
1	Betel leaf extract	100ml
2	Neem extract	50ml
3	Shikakai extract	100ml
4	Reetha extract	100ml
5	Aloe vera juice	100ml
6	Orange peel extract	50ml
7	**Total**	**500 ml**

Table. 2: Composition of Formulation 2 (F2).

Sr. No.	Name of ingredients	Quantity
1	Betel leaf extract	100ml
2	Shikakai extract	100ml
3	Reetha extract	100ml
4	Neem extract	25ml
5	Aloe vera juice	25ml
6	Propyl paraben	10ml
7	Sodium carboxy methyl cellulose	100ml
8	Orange peel oil	15ml
9	Water	25ml
	Total	**500ml**

Table. 3: Role of ingredients.

Sr. No.	Name of ingredients	Role of ingredients
1	Betel leaf	Anti-hair fall
2	Aloe vera	Conditioning agent
3	Neem	Antibacterial
4	Reetha	Foaming agent
5	Shikakai	Foaming agent
6	Orange peel	Perfuming agent
7	Propyl paraben	Preservative
8	Sodium Carboxy Methyl Cellulose	Thickening agent
9	Water	Vehicle

Evaluation of prepared formulations

The two formulations were evaluated by following parameters.

1. Physical appearance:[7] The both formulations prepared were evaluated in terms of their colour, odour, and appearance. The results are mentioned in table 4.

2. Dirt dispersion:[8] Two drops of shampoo was added in a large test tube contain 10ml of distilled water. 1ml of India ink was added; the test was stoppered and shaken as 10 times.

The amount of ink in the foam was estimated as None, Light, Moderate or Heavy. The results are mentioned in table 4.

3. Wetting time test:[9] A canvas paper was cut into 1-inch diameter discs having an average weight of 0.449. The smooth surface of disc was placed on the surface of herbal shampoo solution the stopwatch started. The time required for the disc to begin to sink was noted down as the wetting time. The results are mentioned in table 4.

4. Foaming ability and Foam stability:[10] Foaming ability was determined by using cylinder shake method. Briefly, 50 ml of the herbal shampoo solution was placed into a 250ml graduated cylinder. It was covered with one hand & shaken 10 times. The total volume of foam content after 1min of shaking was recorded. Foam stability was evaluated by recording the foam volume after 1 min & 4min of shake test. The results are mentioned in table 4.

5. Detergency and cleansing action: Cleansing power is evaluated by the method of Bernet & powers. 5gm sample of soiled human hair was placed at 35°C & 200 cc of water containing 1gm of shampoo. The flask is shaken 50 times a minute for 4 minutes. Then washed once again with sufficient amount of water, then after filter the hair dried & weighed. The amount of soil is removed under these conditions is calculated. The results are mentioned in table 4.

6. Procedure for determination of pH

1) Connect the combination pH electrode to the input socket, wash it with water and switch ON the instrument.
2) Dip the electrode in 7 pH buffer solution.
3) Set the temperature control to the buffer solution.
4) Set the function selector switch to pH position and adjust with “CALIBRATE” control till the digital display shows the precise pH value of buffer solution.
5) Now move the function selector switch to “STAND BY”.
6) Remove the electrode from the buffer solution and wash it with distilled or ionized water.
7) Dip the combination electrode in to another buffer solution.
8) Set temperature control to the temperature of the selected buffer solution.

9) Set the function selector switch to pH position. Adjust the slope control at the front panel until the display show the pH value of the select buffer solution. Check that the correct readings are obtained with both buffer solutions.

The results are mentioned in table 4.

7. Procedure for determination of Viscosity

1) Thoroughly clean the Ostwald viscometer with warm chromic acid and if necessary use an organic solvent such as acetone.

2) Mount viscometer in vertical position on a suitable stand.

3) Fill water in dry viscometer up to mark G

4) Count time required, in second for water to flow from mark A to mark B.

5) Repeat step 3 at least 3 times to obtained accurate reading.

6) Rinse viscometer with test liquid and then fill it up to mark A, find out the time required for liquid to flow to mark B.

7) Determination of densities of liquid as mentioned in density determination experiment.

Formula

$$\text{Viscosity} = \frac{\text{Density of test liquid time required for test liquid}}{\text{Density of water time required to flow water.}}$$

The results are mentioned in table 4.

8. Procedure for determination of Density

1) Clean thoroughly the specific gravity bottle with chromic acid or nitric acid.

2) Rinse the bottle at least two to three times with distilled water.

3) If required, rinse the bottle with an organic solvent like acetone and dry.

4) Take the weight of empty dry bottle with capillary tube stopper (w1).

5) Fill the bottle with unknown liquid and place the stopper, wipe out excess liquid from outside the tube using tissue paper.

6) Weight bottle with unknown liquid on analytical balance (w2).

7) Calculate weight in grams of unknown liquid (w3) = (w2 – w1).

Formula

$$\text{Density of unknown liquid} = \frac{\text{Weight of unknown liquid (w)}}{\text{Volume of unknown liquid (v)}}$$

The results are mentioned in table 4.

RESULTS

Table. 4: Results of Evaluation Parameters.

Sr. No.	Parameters	F_1	F_2
1	**Physical appearance**		
A	**Colour**	Brown	Brown
B	**Odour**	Aromatic	Aromatic
C	**Appearance**	Smooth	Smooth
2	**Dirt Dispersion**	Moderate	Heavy
3	**Wetting Test**	37sec	56sec
4	**Foam Ability**	124ml	78ml
5	**Detergency and Cleansing**	Good	Good
6	**Determination of pH**	4.21	4.87
7	**Viscosity**	15.223cp	19.62cp
8	**Density**	1.04gm/ml	1.044gm/ml

DISCUSSION

The herbal shampoos are the preparations which are used for the washing and cleaning of hairs and to provide nourishment. The herbal shampoos are widely used due to their no or less side effects as compared to conventional shampoos, because it contains pure natural or herbal ingredients rather than synthetic chemicals. Herbal shampoo does not require animal testing and it is earth and skin friendly.[11]

CONCLUSION

The herbal liquid shampoo was formulated by using the various herbal ingredients. From the overall results, we can conclude that the herbal shampoo formulation 2(F2) was more stable as compared to other formulation on the basis of their evaluation parameters.

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