

Formulation and Evaluation of Herbal Liquid Shampoo

Payal Karande*, Sarika Kardile*, Tejal Kardile*, Ghugarkar Prasad**

Corresponding Author*

Student, Dr. N J Paulbudhe College of Pharmacy, Shaneshwar Nagar,
Vasant Tekadi, Savedi, Ahmednagar, Maharashtra, India

Co-Corresponding Author**

Assistant Professor, Department of Pharmaceutics, Dr. N J Paulbudhe College of Pharmacy, Shaneshwar Nagar,
Vasant Tekadi, Savedi, Ahmednagar, Maharashtra, India

ABSTRACT

The study aimed to formulate an herbal liquid shampoo and evaluate its physicochemical properties. The herbal liquid shampoo was formulated by adding the extracts of *Emblica officinalis* fruit, *Acacia concinna* Pods, *Sapindus indica* fruit and *Azadirachta indica* leaves to a Xanthum Gum. Small amount of methyl paraben was added as a preservative and pH was adjusted with citric acid. Several tests such as Physical appearance/visual inspection, determination of pH, surface tension measurement, determine percent of solids contents, rheological or viscosity evaluations, wetting time, dirt dispersion and foaming index were performed to determine the physicochemical properties. All the evaluation parameters give the satisfactory results.

KEYWORDS: Herbal shampoo, herbal cosmetic, *Emblica officinalis*, *Acacia concinna*, *Sapindus indica*, *Azadirachta indica*, formulation and evaluation

INTRODUCTION

Herbal shampoos have evolved as an alternative to synthetic shampoos since they are considered safe and the ingredients used in such shampoos have been used traditionally for many years around the world. There are several medicinal plants that are reported to possess beneficial effects on hair and are used in formulation of shampoo in their powdered form or extracts or derivative form. The primary advantage of using natural shampoo is to maintain healthy hair without worrying the side effects of chemicals contained in synthetic shampoos. But, surprisingly many other shampoos available in the commercial market, labelled as 'herbal' or 'natural' are also found to contain one or more of the above synthetic ingredients along with some herbal extracts or natural products in order to expand their commercial value.

Consumers always believe that a good shampoo offers rich lather and therefore the manufacturers include a good number of synthetic detergents or surfactants in to such shampoos, but their regular use often leads to several complications such as dryness of hair, hair loss, irritation to scalp and eyes. Inclusion of other undesirable synthetic chemicals also may result in to serious side effects. ⁽¹⁻⁵⁾

Materials and methods:

Fresh parts of *Emblica officinalis* (amla fruit) and *Azadirachta indica* (neem leaves) were collected from botanical garden and washed under running water to remove contaminants. While *Acacia concinna* (shikakai Pods) and *Sapindus indica* (reetha fruit) were collected in dried form from market. Methyl paraben and Xanthum gum were used.






How to cite this paper: Payal Karande | Sarika Kardile | Tejal Kardile | Ghugarkar Prasad "Formulation and Evaluation of Herbal Liquid Shampoo" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-8 | Issue-2, April 2024, pp.727-731, URL: www.ijtsrd.com/papers/ijtsrd64774.pdf



Copyright © 2024 by author (s) and International Journal of Trend in Scientific Research and Development Journal. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0) (<http://creativecommons.org/licenses/by/4.0>)



Table 1 List of ingredients used in herbal shampoo powder

Sr. no.	Common name	Picture	Botanical name	Part used	Category/ Use
1	Amla		<i>Emblica officinalis</i>	Fruit	Anti-dandruff agent
2	Shikakai		<i>Acacia concinna</i>	Pods	Detergent
3	Reetha		<i>Sapindus indica</i>	Fruit	Hair cleansing and shining property
4	Neem		<i>Azadirachta indica</i>	Leaves	Antiseptic, Antibacterial
5	Lemon oil		<i>Citrus limon Linn</i>	Lemon Peel	Fragrance

Methyl Paraben is used as Preservative and **Xanthum Gum** is used as Thickener.

Method of extraction ⁽⁶⁻⁹⁾

1) Extraction of Amla

- Fresh amla fruit were finely chopped and shed dried for 15 days and powdered using mortar and pestle.
- The powered amla weigh 20gm mixed with 0.25ml chloroform in 100ml water.
- Stir it for 15mins and macerate it for 3 days while stirring in between.
- Filter the solution and allow it to evaporate in rotary evaporator.
- Take the filtrate out of rotary evaporator and completely dry it on hot water bath.
- Keep the extract in desiccator for cooling.
- Collect and weigh the obtained extract.

2) Extraction of Shikakai:

- The Shikakai, are extracted by distillation using a Round bottom flask
- The 20 gm of shikakai powder are added in RBF then add Ethyl alcohol at room temperature by cold distillation Method.
- 20 gm shikakai are weigh and add in separate RBF then add water in boil at 60° in 4 hours by hot distillation method.
- Filter the extract is collected and weigh

3) Extraction of Neem:

- Fresh neem leaves are collected and shed dried for 15 days.
- The dried leaves are then powdered using a motor and pestle.
- The Powdered Neem leaves are sieved and weighed 20 gm and macerated in a beaker using 200 ml of distilled water with continuous stirring.
- The prepared mixture is kept covered with aluminium foil and kept for 3 days for maceration while stirring in between, and then the mixture was filtered using a filter paper.
- The excess solvent is evaporated using a Rotary evaporator and then the remaining mixture was dried on a hot water bath.
- The dried extract was collected and kept in desiccator for cooling.
- The prepared extract is weighed.

4) Extraction of Reetha:

- Fresh reetha fruit is collected; seed is removed and chopped finely using a clean knife.
- The chopped fruit is shed dried for 3 weeks.
- The dried fruit is then powdered using a mixer grinder; the prepared powder is sieved so as to remove any large pieces of the fruit.

- d. The fine powder is then weighed 20 gm.
- e. Measured 100 ml of ether using a measuring cylinder, transfer it to a beaker and add the prepared powder.
- f. Stir the mixture and cover it with an aluminium foil and macerate.

Formulation table:

Table 2 Formulation of herbal shampoo powder

Ingredients	Formula
Amla	20 gm
Shikakai	20 gm
Reetha	20 gm
Neem	20 gm
Lemon oil	QS
Xanthum gum	QS
Methyl paraben	QS
Total	100 ml

Method for preparation of herbal shampoo: ⁽¹⁰⁻¹¹⁾

Take sufficient quantity of Xanthum gum in a beaker



Add the resulting filtrate of Amla, Shikakai, Reetha, and Neem obtained by the extraction process with continues stirring.



A suitable volume of fragrance oil (Lemon oil) has been included in the preparation to enhance the aroma,



Add sufficient quantity of Methyl Paraben as Preservative and Xanthum gum was added to bring the quantity up to 100 ml.



After the preparation of shampoo stored in well close container and evaluate.

Evaluation of Prepared Herbal Liquid Shampoo: (12-15)

To evaluate the prepared formulations, physicochemical tests viz., Physical appearance/visual inspection, Determination of pH, Surface tension measurement, Determine percent of solids contents, Rheological or Viscosity evaluations, Wetting time, Dirt dispersion, Foaming Index. were carried out.

1) Physical appearance/visual inspection: The formulations prepared were evaluated in terms of their colour, odour, and appearance.

2) Determination of pH: A sufficient amount of shampoo solution was constituted in distilled water and the pH of the solution was measured by using a Litmus paper.

3) Surface tension measurement: The surface tension of shampoo in distilled water was measure the using stalagmometer at room temperature.

$$\text{Surface tension}(R2) = \frac{(w3 - w1)n1}{(w2 - w1)n2} \times R1$$

Were,

W1 is weight of empty beaker,

W2 is weight of beaker with distilled water,

W3 is Weight of beaker with shampoo solution,

n1 is no. of drops of distilled water,

n2 is no. of drops of shampoo solution,

R1 is surface tension of distilled water at room temperature,

R2 is surface tension of shampoo solution.

4) Determine percent of solids contents: A clean dry evaporating dish was weighed and added 4 grams of shampoo to the evaporating dish. The dish and shampoo were weighed. The exact weight of the shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated.

$$\text{Percent of solids contents (\%)} = \frac{\text{Practical yield}}{\text{Theoretical yield}} \times 100$$

5) Rheological or Viscosity evaluations: The viscosity of the shampoos was determined by using Brookfield viscometer. 10 ml of shampoo is taken in a beaker and spindle is dipped in it for about 5 min. and then reading is taken.

6) Wetting time: Wetting time was calculated by noting the time required by the canvas paper to sink completely. A canvas paper weighing 0.42gm was cut

into a disc of diameter measuring 1 inch. Over the shampoo surface, the canvas paper disc was kept and the time taken for the paper to sink was measured using the stopwatch.

7) Dirt dispersion: Two drops of shampoo were added in a large test tube contain 10 ml of distilled water. 1 drop of India ink was added; the test tube was stoppered and shakes it ten times. The amount of ink in the foam was estimated as None, Light, Moderate, or Heavy.

8) Foaming Index: Cylinder shake method was used for determining foaming ability. 50ml of the 1% shampoo solution was put into a 250 ml graduated cylinder and covered the cylinder with hand and shaken for 10 times. The total volumes of the foam contents after 1 minute shaking were recorded. The foam volume was calculated only. Immediately after shaking the volume of foam at 1minute intervals for 4 minutes were recorded.

$$\text{Foaming Index} = \frac{1000}{A}$$

Where, A is the volume in ml of the decoction used for preparing the dilution in the tube where foaming to a height of 1 cm is observed.

Result and discussion:

1) Physical appearance/visual inspection: The formulated herbal shampoo was brownish in colour. It has a aromatic odour and smooth appearance

2) Determination of pH: The pH of shampoos has been shown to be important for improving and enhancing the qualities of hair, minimizing irritation to the eyes and stabilizing the ecological balance of the scalp. The current trend to promote shampoos follower pH is one of the ways to minimize damage to the hair. Mild acidity prevents swelling and promotes tightening of the scales, there by inducing shine. The pH of prepared shampoo was observed as 5.5, which is near to the skin pH.

3) Surface tension measurement: Surface tension of prepared formulation of shampoo was found to be 31.70 dynes/cm, indicates good detergent action.

4) Determine percent of solids contents: If the shampoo has too many solids it will be hard to work into the hair or too hard to wash out. The result of percent of solid content was found to be 21.64 %.

Table 3 Observation table

Sr. no.	Test	Observation	
1	Physical appearance/visual inspection	Colour	Brownish
		Odour	Aromatic
		Appearance	Smooth
2	Determination of pH	5.5	
3	Surface tension measurement	31.70 dynes/cm	
4	Determine percent of solids contents	21.64 %	
5	Rheological or Viscosity evaluations	1.32 pascal-sec	
6	Wetting time	2.21 min	
7	Dirt dispersion	Light	
8	Foaming Index	174 ml	

5) Rheological or Viscosity evaluations: The viscosity of the shampoo plays an important role in determining the ease of flow on removal from packing and spreading on application to hair, its self-life stability and product consistency in the package. The viscosity of formulated shampoo was found to be 1.32 poise or pascal-sec which was good enough for its applicability.

6) Wetting time: The wetting ability of a surfactant is dependent on its concentration and is commonly used to test its efficacy. The canvas disk method is a quick, reliable and efficient to evaluate the wetting ability of a shampoo. The wetting time of prepared herbal shampoo was found to be 2.21 min which is good.

7) Dirt dispersion: Shampoo that cause the ink to concentrate in the foam is considered poor quality, the dirt should stay in water. Dirt that stays in the foam will be difficult to rinse away. It will redeposit on the hair. These results indicate that no dirt would stays in the foam; so prepared formulation shows light dirt dispersion is satisfactory.

8) Foaming Index: Although foam generation has little to do with the cleansing ability of shampoos, it is of importance to the consumer. The foaming index of formulated shampoo was found to be 174 ml.

Summary and conclusion:

Herbal shampoo using amla, shikakai, reetha and neem extract is prepared and evaluations were carried out for those following parameters viz., Physical

appearance/visual inspection such as colour, odor and appearance,

Determination of pH, Surface tension measurement, Determine percent of solids contents, Rheological or Viscosity evaluations, Wetting time, Dirt dispersion, Foaming Index. The evaluation parameters data were shown in acceptance range. Further studies are appreciated for comparing this preparation with marketed one and establishing some effective results for hair cleansing action and conditioning effect as well.

The herbal shampoo preparation was formulated based upon traditional knowledge and emphasis was to formulate a stable and functionally effective. The formulated shampoos were not only safer than the chemical conditioning agents, but also greatly reduce the hair loss during combing as well as strengthen the hair growth. The pH of the shampoo was adjusted to 5.5, to retain the acidic mantle of scalp. It was found to be more effective and economical.

REFERENCES

- [1] Prachi S, Sonal D. Preparation of Herbello- an herbal anti-dandruff shampoo. Research article biological science. 2015 Apr-Jun; 5:220-221.
- [2] Jennifer G, Vito R, Paola F, Pinalysa C. Hair care cosmetics: Traditional Shampoo to Solid Clay and Herbal Shampoo, A Review. Cosmetics. 2019 Feb;6(1),13:2-3. DOI: <https://doi.org/10.3390/cosmetics6010013>
- [3] Neelam J, Kalpana P, Rakesh S, Vandana M. Preparation and Evaluation of herbal hair growth promoting shampoo formulation containing Piper betle and Psidium guajava leaves extract. International Journal of green Pharmacy. 2018 Oct-Dec;12(4):S835.
- [4] Utane R, Deo S, Itankar P. Preparation of herbal shampoo (HS) by green method and their characterisation, International Journal of researches in social sciences and information studies. 2017 Mar;5:254.
- [5] Ross J and Miles GD. An apparatus for comparison of foaming properties of soaps and detergents. Oil Soap, 1941; 18(5): 99-102.
- [6] Nafisy AT. A Review of traditional medicine in Iran. Isfahan: Isfahan University Publications, 1989; 133.
- [7] Abbiw DK. Useful plants of Ghana – West African use of wild and cultivated plants. Intermediate Technology Publications and the Royal Botanic Gardens Kew, 1990.
- [8] Hadkar U.B. and Ravindera R.P., Indian Journal of Pharmaceutical Education Research, 2009; 43(2): 187-191.
- [9] Gaud R.S. and Gupta G.D., Practical Physical Pharmacy, 1st ed., C.B.S. Publisher and Distributer, New Delhi, 2001; 81-105.
- [10] Eldridge J.M., Surfactant Science Series, 1997; 68: 83-104.
- [11] Mainkar A.R., and Jolly C.I. International Journal of Cosmetic Science, 2000; 22(5): 385–391.
- [12] Aghel N., Moghimipour B. and Dana R.A.: Iranian Journal of Pharmaceutical Research, 2007; 6(3): 167-172.
- [13] Mahran, GE, Glombitza KW, Mirhom YW, Hartmann R and Michel CG. Novel saponins from Zizyphus spina-christi growing in Egypt. Planta Medica, 1996; 62(2): 163-165.
- [14] Griffin J.J., Corcoran R.F, Akana K.K., Journal of Chemistry. 54th ed., 1977; 553-554.
- [15] Ireland S., Carlino K., Gould L., Frazier F., Haycock P., Ilton S., Deptuck R., Bousfield B., Verge D., Antoni K., MacRae L., Renshaw H., Bialachowski.A., Chagnon C., and Reddy K., Can. J. Neurosci.Nurs, 2007; 29(1): 14-9.