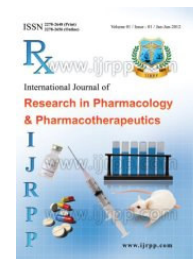




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Preparation and Characterization of Herbal Liquid Shampoo

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ABSTRACT

The aim of this present study is to prepare and formulate an herbal shampoo and to assess its physicochemical properties that emphasis on safety, efficacy, eliminating harmful synthetic ingredient and substitute with safe active natural ingredients. The shampoo was formulated using natural ingredients like *Phyllanthus emblica* (Amla), *Pongamia pinnata* (cinnamon), *Acacia concinna* (Shikakai), *Hibiscus rosa-sinensis* (China rose), *Citrus limon* (Limon), *Eclipta alba* (Bhringraj) and *Aloe barbadensis* (Aloe vera), *syzygium aromaticum* (Clove), *cinnamomum verum* (cinnamon). in different proportions to a 10% aqueous gelatin solution. 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. The result was found within the permitted limits. However, to improve its quality, product performance, and safety, further development was required.

Keywords: Herbal shampoo, *Phyllanthus emblica*, *Pongamia pinnata*, *Citrus limon*, *syzygium aromaticum*, *cinnamomum verum*

INTRODUCTION

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]. Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning scalp and hair in our daily life. Shampoos are most likely utilized as beautifying agents and are a viscous solution of detergents containing suitable additives, preservatives and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The purpose of using shampoo is to remove dirt that is buildup on the hair without stripping out much of the sebum. Many synthetic shampoos are present in the current market

both medicated and non medicated; however, herbal shampoo popularized due to natural origin which is safer, increases consumer demand and free from side effects [2-4]. There are a number of medicinal plants with potential effects on hair used traditionally over years around the world and are incorporated in shampoo formulation [5]. These medicinal plants may be used in extracts form, their powdered form, crude form, or their derivatives [6]. *Phyllanthus emblica* (Amla), and units of dried *A. concinna* (Shikakai) have been utilized customarily as old stories framework for purging hair [7]. Amla fruit and *C. auriculata* flowers are used to promote hair growth, anti-dandruff agent, strengthen hairs, and prevent hair fall [8]. *E. alba* leaves (Bhringraj) commonly known as false daisy in English and Bhringraj in India, to promote hair growth and prevent graying of hair [9]. *H. rosa-sinensis* flower and *A. barbadensis* used as a conditioning agent. *syzygium aromaticum*, *cinnamomum verum* are used for adding flavor to preparation.

MATERIALS AND METHODS

Collection and authentication of Plant Material

The plant materials required for the present study were collected from the tribal belts of the local area of Patrapur and local market of Koraput district.(India) in the month of May 2019.All the plant materials were identified, confirmed and authenticated by the Biju Patnaik Medicinal Plants Garden and Research Centre, Dr. M. S. Swami Nathan Research Foundation, Jeypore, Koraput (District), Orissa (Letter No. MJ/SS/P-703/20,dated (9.6.2020). After authentication all the plant materials were dried and made into coarse powder by grinding in mechanical grinder. and stored in a closed air tight container for further use.

Preparation of extract

About 100 g of each powdered plant materials, namely *P. emblica*, *P. pinnata*, *A.concinna*, *H.rosa-sinensis*, *Eclipta alba*, and *A. barbadensis* 0.5gm of,*syzygium aromaticum*,*cinnamomum verum*. The powdered material was extracted with distilled water by boiling for 4h. The extract of each plant material was collected and evaporated by using water bath[10,11]

Formulation of herbal shampoo

Formulation of the herbal shampoo was done as per the formula given in (Table no1).To the gelatin solution (10%), added the herbal extract and mixed by shaking continuously at the time interval of 15 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.

Table 1: Composition of formulation (F1).

Materials required	Quantity to be weighed
Amlaextract	100ml
Shikakai extract	100ml
China rose extract	100ml
Bhringraj extract	50ml
Clove Powder extract	.5gm
Cinnamon Powder extract	.5gm
Aloe vera extract	50ml
Propyl paraben	10ml
Gelatine	q.s
Lemon juce	q.s
Rose oil	q.s
water	q.s
Total	500ml

Table 2: Composition of formulation (F2).

Materials required	Quantity to be weighed
Amlaextract	100ml
Shikakai extract	100ml
China rose extract	100ml
Bhringraj extract	100ml
Cinnamon extract	25ml
Aloe vera extract	25ml
Sodium Carboxy Methyl Cellulose	100ml
Propyl paraben	10ml
Gelatine	q.s
Lemon juce	q.s
Rose oil	q.s
water	q.s
Total	600ml

Table 3: Description of the ingredients of the herbal shampoo

Slno	Common name	Botanical name	Parts used	
1.	Hibiscus	<i>Hibiscus rosa-sinensis</i>	Flower	Conditioning agent
2.	Shikakai	<i>Acacia concinna</i>	Powder	Detergent
3.	Amla	<i>Emblica officinalis</i>	Fruit	Anti-dandruff agent
4.	Bhringraj	<i>Eclipta alba</i>	Leaves	Hauir growth
5	Cinnamon	<i>cinnamomum verum</i> .	Bark	BlacK ness of Hair

6.	<i>Aloe vera</i>	<i>Aloe barbadensis</i>	Leaf	Coolant
7.	<i>Limbu</i>	<i>Citrus limon</i>	Fruit	Vit.-C (Haur growth)
8.	Clove	<i>syzygium aromaticum</i>	Fruit	Flavour

Evaluation of prepared formulations

The two formulations were evaluated by following parameters.

Physical appearance

The both formulations were prepared and evaluated in terms of their colour, odour, and appearance[12]. The results are mentioned in (Table no4).

Dirt dispersion

Two drops of shampoo was added in a large test tube contain 10ml odistilled 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[13]. The resultsare mentioned in in (Table no4).

Wetting time test

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 [14].The results are mentioned in in (Table no4).

Foaming ability and Foam stability

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 tes[15]. The results are mentioned in (Table no4).

Formula

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

Procedure for determination of Density

Take clean thoroughly the specific gravity bottle with chromic acid or nitric acid. Rinse the bottle at least two to three times with distilled water. If required, rinse the bottle with an organic solvent like acetone and dry.Take the

Detergency and cleansing action

Cleansing power is evaluated by the method ofBernet& 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 no4).

Procedure for determination of pH (by a pH Meter)

Connect the combination pH electrode to the input socket, wash it with water and switch ON the instrument. Dip the electrode in 7 pH buffer solution. Set the temperature control to the buffer solution. 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. Now move the function selector switch to “STAND BY”. Remove the electrode from the buffer solution and wash it with distilled or ionized water. Dip the combination electrode in to another buffer solution. Set temperature control to the temperature of the selected buffer solution. 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 no4).

Procedure for determination of Viscosity

Take thoroughly clean Ostwald viscometer with warm chromic acid or an organic solvent such as acetone. Then mount the viscometer in vertical position on a suitable stand. Fill water in dry viscometer up to mark G. Count time required, in second for water to flow from mark A to mark B. Repeat step 3 at least 3 times to obtained accurate reading. 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. Determination of densities of liquid as mentioned in density determination experiment. The results are mentioned (Table no4).

weight of empty dry bottle with capillary tube stopper (w1). Fill the bottle with unknown liquid and place the stopper, wipe out excess liquid fromoutside the tube using tissue paper.Weight bottle with unknown liquid on analytical balance (w2). Calculate weight in grams of unknown liquid (w3) = (w2 – w1). The results are mentioned in (Table no4).

Formula

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

RESULTS**Table 4: Results of Evaluation Parameters.**

Sl no.	Parameters	F1	F2
1.	Physical appearance		
A	Colour	Brown	Brown
B	Odour	Good	Good
C	Apperance	Smooth	Smooth
2	Dirt Dispersion	Moderate	Heavy
3	Wetting Test	43 sec	58 sec
4	Foam Ability	132ml	76ml
5	Detergency and Cleansing	Good	Good
6	Determination of pH	4.33	4.73
7	Viscosity	15.251cp	18.72cp
8	Density	1.06gm/ml	1.055gm/ml

DISCUSSION

The present study was carried out with the aim of preparing the herbal liquid shampoo. The main purpose behind this investigation was to develop a stable and functionally effective shampoo and to evaluate for good product performance of the prepared shampoo. Which was formulated with the aqueous extract of different medicinal plants that are commonly used for cleansing hair traditionally. The use of shikakai, amla, and other plant extracts instead of synthetic cationic conditioners. From the overall results, we can conclude that the herbal shampoo formulation (F2) was more stable as compared to other formulation on the basis of their evaluation parameters.

CONCLUSION

The herbal liquid shampoo was formulated by using the various herbal ingredients. that reduces hair loss during combing, safer than the chemical conditioning agents as well as to strengthen the hair growth. The herbal shampoos are widely used due to their no or less side effects as compared to conventional shampoos, But further scientific validation is needed for its overall quality.

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