Original Research Article

Formulation and Evaluation of Herbal Baby Shampoo

ABSTRACT

Shampoos are most probably used as cosmetics. In general, hair care products are used for cleaning scalp and also used for beautifying agents. It contains suitable additives preservatives and active ingredients. The purpose of using shampoo is to remove dirt that is build up on the hair without stripping out much of this bum. The herbal shampoo popularized due to formulated from herbal sources which is safer with milder effect. In this study, herbal shampoo was formulated containing suitable ingredient such as *Lawsonia inermis (L)* Henna), *Azadirachta indica* A. Juss. (Neem), *Hibiscus rosa-sinensis L* (Hibiscus), *Ficus benghalensis L.* (Banyan), *Phyllanthus* emblica L. (Amla), *Sapindus mukorossi* Gaertn. (Ritha), *Senegalia rugata* (Lam.) Britton & Rose. (Shikakai) and *Aloe vera (L.) Burm.f.* (Aloe vera) different proportions to formulate and evaluate its physicochemical properties. Marketed crude products of the above-mentioned herbal drugs were used in the formulation of herbal shampoo. Ritha and Shikakai when shaken with water create rich foam impact. Amla fruit and *Hibiscus rosa-sinensis L.* flowers are used to promote hair growth, anti-dandruff agent, strengthen hairs, and prevent hair fall. Dried roots of *Ficus benghalensis* (Banyan) produce Lustrous effects on hairs. *H. rosa-sinensis* flower and *Aloe vera* (L) used as a conditioning agent and also moisturizing agent. The formulated herbal shampoo was evaluated for its physical and chemical stability.

Keywords: Natural plants, Hair cosmetic, Conditioning effect, Non-irritant, Herbal shampoo.

INTRODUCTION

In this study, formulate herbal baby shampoo using natural extracts and evaluated Physico-chemical parameters, conditioning effects, Moisturizing effect and anti-dandruff effect this determination is very simple, reproducible and quantitative. In synthetic shampoos, surfactants(synthetic)are added mainly for their cleansing and foaming property, but the continuous use of these surfactants leads to serious effects such as eye irritation, scalp irritation, hair loss and hair dryness. We use shampoo containing natural herbals instead of synthetic shampoo. However, formulating cosmetic products containing only natural substances are very difficult. These medicinal plants may be used in extracts form, their powdered form, crude form, or their derivatives. They develop shampoo containing natural substance for safer and milder effect, then commercial shampoo is difficult and it posses good foaming, detergency, and solid content as such synthetic shampoo. [1]

You can start using a few drops of a gentle herbal baby shampoo on their hair. Small amount of skin protective oils intact with skin surface. If the baby get older and grows a full head of hair, you may begin to use a little more shampoo to get their hair clean.[2] Baby skin is thinner and dries out much faster than adult skin, so choosing a gentle, baby-friendly shampoo can help keep their skin from getting dry and itchy.[3]

Herbal baby Shampoo can help loosen spit-up, food, oils, and anything else that gets into the baby's hair. The right baby shampoo is gentle enough to use regularly, and will not dry out the skin or hair. [4] Every baby is different, and no shampoo will work well for everyone. Consider fragrance-free products. They may be less irritating. Herbal baby shampoo will not cause a baby to grow hair or make the hair grow faster. Hair growth associated with harmonal and genetic effects. Herbal baby shampoo can keep the hair healthy so that it grows long and strong. [5]

In this study, involves we used the following herbal crude material based on their functions such as dry fruits of Ritha, products of amla and units of dried shikakai used for framework for purging hair. Ritha and shikakai when shaken with water create rich foam impact. Amla fruit and *Hibiscusrosa-sinensis* flowers are used to promote hair growth, anti-dandruff agent, strengthen hairs,and prevent hair fall. Dried roots of *Ficus benghalensis L.* (Banyan) produce Lustrous effects on hairs. *H.rosa-sinensis* flower and *Aloe vera.* used as a conditioning agent and also moisturizing agent.[6]

MATERIAL AND METHODS OF FORMULATION

1. Collection of crude herbal dried powder:

The herbal sources of different dried powder materials are collected from authorized herbal store.

2. Preparation of herbal extracts:

The individual powdered material was extracted with distilled water by boiling for 4 hours.Then the extract of each plant material was separated and evaporated. They are *Lawsonia inermis* L. (Henna), *Azadirachta indica* A.Juss

(Neem), *Hibiscus rosa-sinensis* L. (Hibiscus), *Ficus benghalensis* L. (Banyan), *Phyllanthus emblica* L. (Amla), *Sapindus mukorossi* Gaertn. (Ritha), *Senegalia rugata (Lam.)* Britton & Rose (Shikakai), *Aloe vera L.* Burm.f. (Aloe vera) and which anti-dandruff and conditioning properties already reported were homogenized and extracted using ethanol(70%v/v).The extract were filtered and concentrated to dryness under reduced pressure and controlled temperature (50-55°C) to obtain solvent free semisolid extracts. The solvent free extracts was washed, weighed and packed into plastic containers and stored in room temperature. [7]

3. Preparation of extract (Decotion method)

About 100 g of each powdered plant materials, namely *Lawsonia inermis* L. (Henna), *Azadirachta indica* A.Juss (Neem), *Hibiscus rosa-sinensis* L. (Hibiscus), *Ficus benghalensis* L. (Banyan), *Phyllanthus emblica* L. (Amla), *Sapindus mukorossi* Gaertn. (Ritha), *Senegalia rugata (Lam.)* Britton & Rose (Shikakai), *Aloe vera L.* Burm.f. (Aloe vera) were homogenized. The powdered material was extracted with distilled water by boiling for 4h.The extract of each plant material was separated and evaporated. [8]

Table 1: Description of ingredients of Herbal baby shampoo

S. No.	Common name	**Pictures**	Botanical name	Family	Parts used	Application
1	Henna		*Lawsonia inermis*	Lythraceae	Leaf	• Growth of hair conditioner.
2	Neem		*Azadirachta indica*	Meliaceae	Leaf	• Prevent the dryness of hairs • Flaking of hairs.
3	Hibiscus		*Hibiscus rosa-sinensis*	Malvaceae	Flower	• Conditioning effect • Prevents hair loss • Hair growth promoter.
4	Banyan		*Ficus benghalensis*	Moraceae	Root	• Lustrous effects on hairs.

5	Amla		*Phyllanthus emblica*	Euphorbiaceae	Fruit	• Anti-dandruff agent • Darkening of hairs • Hair growth promoter.
6	Ritha		*Sapindus mukorossi*	Sapindaceae	Fruit	• Detergent and antidandruff.
7	Shikakai		*Senegalia rugata*	Fabaceae	Fruit	• Detergent, • Foam base and anti dandruff.
8	Aloe vera		*Aloe vera*	Asphodelaceae	Leaf pulp	• Coolant, • Conditioner and moisturizing effect.

Collection of standardized herbal crude material from authorized herbal store and weighed individually.

↓

100g of each powdered crude material is added with 50 ml of water (except Ritha & Shikakai are extract separately)are boiling for 4 hr by using decoction method to get concentrated product.

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The extract of ritha & shikakai was separated and evaporated individually to get concentrated product (boiling for 4 hr.).

↓

The extract of ritha &shikakai are mixed with above extract .

↓

To these add gaur gum & mixed by shaking continuously for 20 min.

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0.05% of methyl paraben was also added with constant stirring.

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To improve aroma in the formulation, sufficient quantity of essential oil (rose oil) was added and made up the volume to 20 ml with distilled water.

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Smooth viscous clear liquid shampoo is formed.

Figure no. 1 Steps involved in formulation of herbal baby shampoo

4. Formulation of herbal baby shampoo

Formulation of three different clear liquid herbal baby shampoo (formulation code F1,F2,F3)has been formulated by using gaur gum as a base with different excipients such as sodium laureth sulphate (SLES), 0.05% methylparaben and essential oil (rose oil) as flavoring agent. To the above herbal extract guar gum powder (10%) is added with continuous stirring to produce suitable consistency at the time interval of 20 min. [9]

Table 2: Formulation of herbal baby shampoo using different concentration

S.NO	Ingredients	Formulation F1	Quantity for 25g	Formulation F2	Quantity for 25g	Formulation F3	Quantity for 25g
1	Henna extract	5%	1.25g	20%	5g	5%	1.25g
2	Neem extract	10%	2.5g	9%	2.25g	10%	2.5g
3	Hibiscus extract	25%	6.25g	12%	3g	20%	5g
4	Banyan extract	5%	1.25g	25%	6.25g	10%	2.5g
5	Amla extract	20%	5g	25%	6.25g	25%	6.25g
6	Ritha extract	5%	1.25g	1%	0.25g	1%	0.25g
7	shikakai extract	10%	2.5g	1%	0.25g	1%	0.25g
8	Aloe vera gel	20%	5g	7%	1.75g	28%	7g
9	Gaur gum powder	q.s	q.s	q.s	q.s	q.s	q.s
10	Methyl paraben	q.s	q.s	q.s	q.s	q.s	q.s
11	Distilled water	q.s	q.s	q.s	q.s	q.s	q.s

Different concentration of formulation (F1, F2, F3) were used for the study. Each shampoo in the study was used in its different concentration forms. Add Gaur gum powder is used as an emulsifying agents. And, also add methyl paraben is used as a preservative.

4. Evaluation of herbal baby shampoo

Here physico-chemical evaluation of shampoo and its rheological studies are carried out for quality, safety and efficacy.

RESULTS AND DISCUSSIONS

1. Organoleptic characters:

Colour: Brown

Odour: Pleasant

Appearance: Turbid

Texture: Smooth viscous. [10]

2. Determination of pH:

The pH of the prepared herbal baby shampoo in distilled water (10% v/v) was evaluated by means of pH analyzer at room temperature. [11]

✓pH of the prepared herbal baby shampoo is 6.21

[Note: Ideal pH of herbal baby shampoo=6-7]

Figure no 2: pH determination of Herbal baby shampoo

3. Determination of percentage solid content:

Weight of empty evaporating dish (A) = 120.75g

Weight of evaporating dish with sample = 124.31g

Weight of evaporating dish after evaporation (B) = 121.5g

Weight of sample = (B) - (A) = 121.5 - 120.75 = 0.75g

Total Solid Content = 0.75g

% Solid content= (Net weight of the dry specimen/Net weight of the original specimen) × 100

(i.e) % Solid Content= (B-A) /4 × 100

= 0.75/3 × 100

= 25%

[Note: % solid content of good herbal baby shampoo = 20%-30% of solids]

Figure no 3: Determination of Solid Content percentage

4. Surface tension measurement :[12]

R2 = (W2-W1) n1 R1 / (W2-W1) n2

W1= Weight of empty beaker = 52.94

W2= Weight of beaker with distilled water = 63.3

n1= Number of drops of distilled water = 50

n2 = Number of drops of Shampoo solution = 45

R1 = Surface tension of distilled water at room temperature =35

R2 = Surface tension of Shampoo solution = ?

R2 = (W2-W1) n1 R1 / (W2-W1) n2

R2 = (63.3-52.94)50×35 / (63.3-52.94)45 = 38.88 dynes/cm.

[Note: Standard surface tension of Herbal baby shampoo: 38.36+/-1.14]

5. Test of wetting time:

✓ The wetting time of Herbal baby shampoo = 90 sec. [13]

6. Foam stability test:

Table 3: Foam stability test containing stock solution

S. No	Number of test tube containing ml of stock solution	Height of foam in cm
1	1ml	0.5cm
2	2ml	1.2cm
3	3ml	2.5cm
4	4ml	2.5cm
5	5ml	2.7cm

Foaming index=1000/A, Foaming volume = 25ml

Where, A= Volume of decoction having exact 1cm height

Foaming index = 1000/2.5= 400

8. Dirt dispersion test

Volume of ink = 1 drop of ink (0.1ml)

Colour of the foam = Light colour. [13]

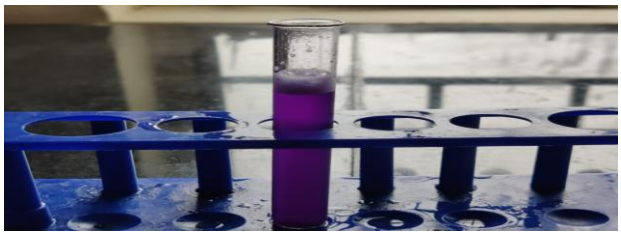

Figure no 4: Dirt dispersion test

9. Rheological evaluation:

The viscosity profile of the herbal shampoo formulation was measured using Brookfield viscometer at 25°C, Instrument model: DV-E viscometer and Spindle type: S62 spindle. [14]

Table 4: Measurement of viscosity by Brookfield viscometer.

S.NO	Rpm(Rotation per min)	Cp(Centipoise)	Torque
1	10 Rpm	195	%6.5
2	20Rpm	185	%12.3
3	30Rpm	179	%17.9
4	50Rpm	170	%28.5
5	60Rpm	169	%33.4
6	100Rpm	159.3	%53.1

Table 5: Physio-chemical properties of formulated herbal baby shampoo

S.no	Test method	Formulation, F1	Formulation, F2	Formulation, F3
1	Physical appearance/Visual inspection	brown, clear, pleasant	brown, clear, pleasant	brown, clear, pleasant
2	Determination of pH	7.5	8.0	6.5
3	Rheological evaluation (Viscosity measurement)	120 at 100 rpm	162.3 at 100 rpm	159.5 at 100 rpm
4	Determination of percentage solid content	20%	30%	25%
5	Surface tension measurement	40.01 dynes/cm	35.55 dynes/cm	38.88 dynes/cm
6	Wetting test	92 sec	95 sec	90 sec
7	Foam stability test	Dense	dense	Dense, small
8	Dirt dispersion test	Slightly brown	Light brown	Light

From, the above three formulation F1, F2, F3 are evaluated. Based on the test report F1 and F2 formulation failed the test and F3 is passes the evaluation test.

DISCUSSION

The laboratory formulation (Formulation F3: Ritha and shikakai extract of foam base were found to be better with respect to Foaming ability and produce anti-dandruff effect then the formulation F2 which was formulated with

higher concentration of foam base. Formulation F3 provided stable foam, surface tension reduction, good cleaning and wetting effect. Aloe vera contains 75 potentially active constituents, due this phytoconstituents resulted conditioning and moisturizing effect on baby scalp. [15]

Table 6: Physicochemical study of herbal baby shampoo

S.NO	**Evaluation test**	**Formulated herbal baby shampoo**	**Commercial herbal baby shampoo**
1	Colour	Brown	Brown
2	Transparency	Clear	Clear
3	Odour	Pleasant	Good
4	pH of 10% solution	6.5	7
5	Solid Content (%)	25	23.25
6	Foam volume (ml)	25	26
7	Foam type	dense, small	dense,small
8	Surface tension (dynes/cm)	38.88	35.18
9	Wetting time (s)	90 s	120s
10	Viscosity (Cp)	159.3 at 100rpm	200 at 100rpm

7. CONCLUSIONS

The present study was carried out with the aim of preparing the herbal baby shampoo that reduces hair loss during combing, safer than the chemical conditioning agents as well as to strengthen the hair growth. Herbal shampoo was formulated with the aqueous extract of crude powdered herbal drug.

The main purpose of the formulation involves to develop functionally effective shampoo by excluding all synthetic additives, which are generally incorporated in such formulation. To evaluate for good product performance of the prepared herbal baby shampoo, many tests were performed. The herbal formulation prevents the irritation as it is mild acidic in nature.The results of the evaluation study of the developed herbal baby shampoo revealed a comparable result for quality control test, but further scientific validation is needed for its overall quality. In comparative studies of conditioning effect of different test shampoos, formulation F3 gives very good conditioning effect on hair. This indicates that despite the damage to the cuticle by the detergent, the conditioning agents used in the shampoo formulation are successful in preventing cuticle uplift. Hence, we could conclude that it is a very crucial step for quality control of herbal baby shampoo.

Nowadays there is strong demand for natural therapies, and this is increasing in western countries. The herbs which area cheapest of Phyto constituents are on wheals to attain their role in Poly herbal formulation so as to have synergistic role. From the present study, tested herbal baby shampoo formulations possess all evaluation parameters which satisfy an ideal shampoo property.

NOTE:

The study highlights the efficacy of "herbal", “medicinal” which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

8. REFERENCES

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