

PREPARATION AND EVALUATION OF HERBAL POWDERED SHAMPOO

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ABSTRACT

Today's shampoo formulations are beyond the stage of pure cleaning of the hair. Additional benefits are expected, e.g., conditioning, smoothing of the hair surface, good health of hair, i.e., hair free of dandruff, dirt, grease and lice and, above all, its safety benefits are expected. To evaluate the prepared formulations, quality control tests including visual assessment and physicochemical controls such as pH, density and viscosity were performed. Physical appearance/visual inspection, Determination of pH, Determine percent of solids contents, Rheological evaluations, Dirt dispersion, Cleaning action, Surface tension measurement, Detergency ability, Foaming ability and foam

stability, The preparations were formulated using bahera, amla, neem, tulsi, shikakai, henna & brahmi 20, 25, 30,10,1,12,1,1%. Ash value is calculated to determine the inorganic contents which are characteristic for an herb. Particle size Angle of repose Bulk density 25-20 micrometer 20.550 5/g/cc of powdered shampoo. Average % foaming capacity, total Ash, acid insoluble, Moisture Content, pH value 151.8, 4.45 % w/w, 2.35%, 2.00% w/w, 6.5 was found respectively. Cleaning percentage, surface tension, detergency, viscosity, foaming ability and foaming solubility was found to be 24.21, 32.15dyne/cm, 64.23%, 94607.84 cps, 170 ml respectively. In the present scenario, it seems improbable that herbal shampoo, although better in performance and safer than the synthetic ones, will be popular with the consumers.

KEYWORDS: Herbal Shampoo, Evaluation, physico-chemical approach, cleaning action, foaming capacity

INTRODUCTION

Hair is one of the important parameters in judging the characteristics of internal body conditions. Various synthetic chemical substances like dyes, shampoos, conditioners, perms, hair gels, straighteners and sprays have harmful effect on hair; these change the growth, structure and texture of hair. Nowadays, due to people awareness more and more of the population is inclined towards using herbal substances having lesser toxicity, lesser side-effects as compared to synthetic ones. Most common form of hair conditioning is shampooing. The vital function of shampoo aims in cleansing of the hair due to accumulation of sebum, dust, scalp debris (dead cells) etc. Shampoo formulations are associated with improving hair quality, hair care habit and specific targeted problems such as treatment of oily scalp, dandruff and for androgenic alopecia. Shampoos are liquid, creamy or gel like preparations.^[1]

From time immemorial Indian women use herbals such as *Shikkakai* and *Reetha* that are used as natural cleansing agents without harmful effects.

Active ingredient for powder hair shampoo is based on:

- The ability of the ingredient to prevent skin damage, and,
- To improve the quality of skin by cleansing, nourishing and protecting the skin.

In this research article, formulation and evaluation of herbal shampoo powder were reported. The present objective of this research work was to develop an herbal powder shampoo which clears sebum, dirt, dandruff, promoting hair growth, strengthening and darkening it. Moreover, it also acts as a conditioning agent. This herbal shampoo powder performs all these actions without affecting or damaging hair.^[2]

IDEAL CHARACTERISTICS OF ANY SHAMPOO

- ❖ It should be able to effectively and completely remove the dust or pollution debris, excess sebum or other fatty substances and loose corneal cells from the hair.
- ❖ It should effectively cleanse hair.
- ❖ It should produce good amount of lather for fulfilling psychological satisfaction of the user.
- ❖ The shampoo should be easily removed by rinsing with water.
- ❖ Should leave the hair moisturised, soft, lustrous with good manageability.
- ❖ Should leave a pleasant fragrance in the hair.

- ❖ Should not make the hands of the user rough and chapped.
- ❖ Should not have any harmful side effects or cause irritation to skin or eye.

COMPOSITION OF SHAMPOO

An ideal shampoo should contain the following excipients that are:

- Surfactant
- Antidandruff agents
- Conditioning agents
- Pearlescent agents
- Sequestrants
- Thickening agents
- Colours, perfumes, and,
- Preservatives.

TYPES OF SHAMPOO

Shampoos are divided into the following broad categories:

- Powder Shampoo
- Liquid Shampoo
- Lotion Shampoo
- Cream Shampoo
- Jelly Shampoo
- Aerosol Shampoo
- Specialized Shampoo
- Conditioning Shampoo
- Anti-dandruff Shampoo
- Baby Shampoo
- Bi-layer Shampoo

METHODS

Collection of materials

Different parts of plant were selected and collected to study hair care product. The selected plants are of amla, neem, shikakai, tulsi, behera, brahmi, henna. All the required powders of amla fruit, behera fruit, shikakai fruit, and neem leaves, brahmi leaves, tulsi leaves, hena

leaves were collected from the local herbal drug store market. The raw materials collected were given with their biological source and uses respectively in Table 1.

Method of preparation of herbal shampoo powder

These powders were accurately weighed, passed through sieve No. 100 and then mixed in their ascending order of quantities with continuous trituration and stored in airtight containers until it was used for further studies. Three batches of the herbal shampoo powder formulations were prepared, labeled and stored in a well closed container and used for further studies.^[3]

Table 1: The herbs used in the preparation of herbal shampoo powder.

Sl. No.	Constituents	Biological source	Use
1	Amla fruit	Dried ripe fruits of <i>E. officinalis</i>	Hair darkening Hair growth promoter
2	Neem	Dried leaves of <i>A. indica</i>	Anti-dandruff agent Anti-bacterial agent
3	Shikakai fruit	Dried pods of <i>A. concinna</i>	Foaming agent Anti-dandruff agent
4	Tulsi	Dried leaves of <i>O. sanctum</i>	Anti-dandruff agent
5	Bahera	Dried fruits of <i>T. bellirica</i>	Hair darkening Hair growth promoter
6	Brahmi	Dried leaves of <i>C. asiatica</i>	Support Health of Hair
7	Henna	Dried leaves of <i>L.inermis</i>	Hair conditioner

Table 2: The formulations of herbal shampoo powder.

S.No	Constituents	F1	F2	F3
1	Behera	25	30	28
2	Amla	30	10	15
3	Neem	10	05	09
4	Tulsi	1	02	05
5	Shikakai	12	22	15
6	Henna	1	5	3
7	Brahmi	1	1	2

Evaluation of herbal shampoo powder

Particle size

The particle size of herbal shampoo powder was determined by using microscopic method. Place the stage micrometer on the stage of the microscope and initially focus on lower power by positioning the object to the centre of the object. Focus the object, measure the size of each particle in terms of eyepiece division. Select two points one on left side other on right side. Calculation can be done by using calibration factor.^[4,5]

Calibration Factor= number of stage division/ Number of eyepiece division ×10

Angle of repose

A glass funnel was held in place with a clamp on ring support over a glass plate. The glass plate was placed on a micro lab jack. Approximately, 10 g of the powder was transferred into the funnel keeping the orifice of funnel blocked by the thumb. As the thumb was removed, the lab jack was adjusted so as to lower the plate and maintain about 2 cm gap between the bottom of the funnel stem and the top of the powder pile. When the powder was emptied from the funnel, the angle of the heap to the horizontal plane was measured with a protractor. The height and radius were measured using a ruler. The angle of repose was thus estimated by the following formula. It is expressed in g/cm³.^[6,7]

$$\Theta = \tan^{-1} (h/r)$$

Where,

h= Height of the pile formed.

r = the radius of the base of pile.

Bulk density

The bulk density of a powder is the ratio of the mass of an untapped powder sample and its volume, including the contribution of inter particulate void volume. Hence, the bulk density depends on both the density of powder particles and the spatial arrangement of particles in the powdered. The bulk density is expressed in g/cm³. A volume of 100 ml graduated cylinder was taken and required amount of herbal shampoo powders was added to the graduated cylinder. This was transferred to bulk density apparatus and bulk density was calculated. It is an important property for packaging and uniformity in the bulk of the product.^[8]

Bulk density=Mass of powder/Bulk volume of the powder

Physicochemical evaluation

Ash value

This value is used to determine quality and purity of herbal shampoo powder and to establish the identity of it.^[8]

Determination of total ash

A flat, thin, porcelain dish or a tarred silica crucible was weighed and ignited. About 2 g of herbal shampoo powder formulation were weighed and taken into a dish. Support the dish on

a pipe-clay triangle placed on a ring of retort stand. Heat the dish about 7 cm above the flame, with the help of a burner, using a flame of about 2 cm high, heat till vapors almost cease to be evolved, then lower the dish and heat more strongly until all the carbon is burnt off. Cool in a dessicator. Weigh the ash and calculate the percentage of total ash with reference to the air dried shampoo powders.^[9]

$$\text{Total ash value of the sample} = 100(z-x)/y\%$$

Moisture content determination

10 g of herbal shampoo powder formulations was placed in a tarred evaporating dish and kept in hot air oven for 105°C. The weight loss was observed at an interval of 15 minutes until constant weight was obtained.^[10]

pH

A pH meter is an electronic device used for measuring the pH of a liquid. A typical pH meter consists of a special measuring probe connected to an electronic meter that measures and displays the pH reading.^[11]

1 g each of herbal shampoo powder formulations was taken and dissolved in 10 ml of water. Their pH was checked with the help of pH meter.

Cleaning action

5 g of wool yarn/cotton ball was taken and placed in grease; the same was then placed in a 200 ml of water containing 1 g of each herbal shampoo powder formulations in a flask and was shaken for 4 minutes. The solution was removed and sample was taken out, dried and weighed. The amount of grease removed was calculated using the formula^[12]

$$DP = 100 (1 - T/C)$$

Foaming capacity

2 g of each herbal shampoo powder formulations were taken in a 250 ml graduated cylinder, 50 ml of water was added and shaken for 5-10 times. The foaming capacities of all the formulations after 1 minute shaking and % foaming capacities of all the five formulations for a time period of 60 minutes were performed.^[13]

Dirt dispersion

Two drops of each 1% herbal shampoo powder formulations were added in a large test tube containing 10 ml of distilled water. A drop of Indian ink was added; the test tubes were

stoppered and shaken. The amount of ink in the foam was estimated as none, moderate, or heavy.^[14]

Wetting time

A canvas was taken and cut into 1 inch diameter discs. The discs were floated on the surface of each formulations of 1% herbal shampoo powder solution and time was noted. The time required for the disc to begin to sink was measured accurately and noted as wetting time.^[15]

Nature of hair after wash

Nature of hair after wash was done by applying a small quantity of herbal shampoo powder formulations on hair and then washed.^[16]

The % foaming capacity of herbal shampoo powders

Time (minutes)	% Foaming capacity		
	F1	F2	F3
0	187.5	282.3	175.2
5	160.0	210.5	159.3
30	140.0	189.5	138.5
60	120.0	192.2	120.5
Average foaming capacity	151.8	218.6	148.3

The cleaning evaluation parameter			
Evaluation parameter	F1	F2	F3
Cleaning action	29.5%	33.2%	31.3%

The foaming capacities of all the five formulations			
Evaluation parameter	F1	F2	F3
Foaming capacity	Mild foam	Good foam	Good foam

RESULTS AND CONCLUSION

The preparations were formulated using bahera, amla, neem, tulsi, shikakai, henna & brahmi 20, 25,30,10,1,12,1,1%. Ash value is calculated to determine the inorganic contents which are characteristic for an herb. Particle size Angle of repose Bulk density 25-20 micrometer 20.550 5/g/cc of powdered shampoo. Average % foaming capacity, total Ash, acid insoluble, Moisture Content, pH value 151.8, 4.45% w/w, 2.35%, 2.00% w/w, 6.5 was found respectively. Cleaning percentage, surface tension, detergency, viscosity, foaming ability and foaming solubility was found to be 24.21, 32.15dyne/cm, 64.23%, 94607.84 cps, 170 ml respectively.

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