

# Formulation and Evaluation of Herbal Shampoo Powder

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## ABSTRACT

The shampoo sector is probably the largest unit sale among the hair care products since shampoos are one of the cosmetic products used in daily life. Synthetic preservatives and detergents have sometimes been the cause of adverse effects among consumer. A more radical approach in reducing the synthetic ingredients is by incorporating natural extracts whose functionality is comparable with their synthetic ingredients. A shampoo is a cleaning aid for the hair and is counted among the foremost beauty products. 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, e.g. hair free of dandruff, dirt, grease and lice and, above all, its safety benefits are expected. As the scalp is one of the most absorbent part of the body, product applied to the scalp go directly to the blood, without being filtered in any way. In the scenario of changing food habits, stress level and dependent environment conditions, numbers of skin and hair disorder are encountered. This herbal shampoo was formulated using natural ingredient like *Azadirachta indica* (neem), *Acacia concinna* (shikakai), *Spindus mokorossi* (reetha), *ocimumsanctum* (Tulsi), *Aloevera* (aloe), *Embelicaofficinlis* (amla), *lawsonia inermis* (Henna), *Terminalia chebula* (harda), *Terminalia balerica* (bahera), *centilla asiatica* (brahmi) with proven efficacy of hair care preparation is prepared. The combination of several such ingredient of herbal origin has made it possible to secure highly effective dry powder shampoo. The formulation at laboratory scale was done and evaluated for number of parameters to ensure its safety and efficacy.

**Keywords:** Herbal, Shampoo, Neem, Harda, Shikakaki, Evaluation, Standardization.

## INTRODUCTION

Hairs are the integral part of human beauty. People are using herbs for cleaning, beautifying and managing hair since the ancient era. As the time has passed synthetic agents have taken a large share but today people are getting aware of their harmful effects on hairs skin and eyes. These regions attracted to community towards the herbal products, which are less expensive and have negligible side effects. Hair cleansers or shampoos are used not only for cleansing purpose but also for imparting gloss to hair and to maintain their manageability and oiliness for hairs<sup>1</sup>.

Shampoos are of various types, like powder shampoo, clear liquid shampoo liquid shampoo, lotion shampoo, solid gel shampoo, medicated shampoo, liquid herbal shampoo etc. As far as herbal shampoos are concerned in stability criteria. Depending upon the nature of the ingredients they may be simple or plain shampoo, antiseptic or antidandruff shampoo

and nutritional shampoo containing vitamin, amino acids proteins hydrolysate.<sup>2</sup>

## IDEAL CHARACTERS OF SHAMPOO<sup>3</sup>

1. Should effectively and completely remove the dust, excessive sebum.
2. Should effectively wash hair.
3. Should product a good amount of foam
4. The shampoo should be easily removed by rinsing with water.
5. Should leave the hair non dry, soft, lustrous with good, manageability`
6. Should impart a pleasant fragrance to the hair.
7. Should not make the hand rough and chapped.
8. Should not have any side effects or cause irritation to skin or eye.

## COMPOSITION OF SHAMPOO<sup>3</sup>

1. Surfactant.
2. Antidandruff agent

3. Conditioning agent
4. Pearlescent agent
5. Sequestrants
6. Thickening agent
7. Colours, perfumes and preservative

#### TYPES OF SHAMPOO <sup>4</sup>

Shampoos are of following types

- Powder shampoo
- Liquid shampoo
- Lotion shampoo
- Cream shampoo
- Jelly shampoo
- Aerosol shampoo

#### CATEGORIES OF SHAMPOO <sup>5</sup>

- Specialized shampoo
- Conditioning shampoo
- Anti-dandruff shampoo
- Baby shampoo
- Two layer shampoo

#### MATERIALS AND METHODS

The herbal shampoo powder was formulated using following natural ingredients, which are tabulated in Table No.: 1.

#### FORMULATION OF HERBAL SHAMPOO

Selected herbal drugs in dried form were purchased from the authenticated agencies. Herbs along with their part used in shampoo and quantity taken are tabulated in Table 1. Herbal shampoo was prepared by uniformly powdering and mixing in ascending order by weight with continuous trituration. Six batches of herbal shampoo formulation were prepared labeled and kept in closed container for further studies. <sup>6-9</sup>

#### PREPARATION PROCEDURE OF HERBAL SHAMPOO POWDER <sup>10-14</sup>

Following steps are followed in sequential manner for formulation of herbal shampoo powder.

- **Drying:-** All the powder are in dry form and grinded
- **Weighing:** - All the required herbal powders for shampoo preparation were weighed individually.
- **Size reduction:** - The crude ingredients were collected and these ingredients were size reduced using hand driven mixer individually.
- **Mixing:** - All these fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder.

- **Sieving:** - Then this fine powder was passed through sieve no :80, to get the sufficient quantity of fine powder.
- **Packing and labeling:** - Then it was packed and labeled suitably.

#### EVALUATION OF HERBAL SHAMPOO POWDER <sup>15-19</sup>

Prepared formulations of shampoos were subjected to following evaluation parameters.

##### (I) Organoleptic evaluation

Organoleptic evaluation on the parameters like colour, odour taste and texture was carried out. Colour and texture was evaluated by vision and touch sensation respectively. For taste and odour evaluation a team of five taste and odour sensitive persons was formed and random sampling was performed.

##### (II) General powder characteristic

General powder characteristics includes evaluation of those parameters which are going to affect the external properties (like flow properties, appearance, packaging criteria etc.) of the preparation, Characteristics evaluated under this section are powder form, particle size angle of repose and bulk density. Sample for all these evaluation were taken at three different level i.e. from top, middle and lower level.

##### 1. Particle size

Particle size is a parameter, which could affect various properties like spreadability, grittiness etc., particle size was determined by sieving method by using I.P. Standard sieves by mechanical shaking for 10 Min.

##### 2. Angle of repose

It is defined as the maximum angle possible in between the surface of pile of powder to the horizontal flow.

##### Funnel method

Required quality of dried powder is taken in a funnel placed at a height of 6 cm from a horizontal base. The powder was allowed to flow to form a heap over the paper on the horizontal plane. The height and radius of the powder was noted and recorded the angle of repose ( $\theta$ ) can be calculated by using the formula. Required amount of dried powder is placed in a cylindrical tube open at both ends is placed on a horizontal surface. Then the funnel should be raised to form a heap. The height and radius of the heap is noted and recorded. For the above

two method, the angle of repose ( $\theta$ ) can be calculated by using the formula.

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

Where,

$\theta$  – Angle of repose, h – height of the heap,

r – Radius of the base

### 3. Bulk density

Bulk density is the ratio between the given mass of a powder and its bulk volume. Required amount of powder is dried and filled in a 50 ml measuring cylinder up to 50 ml mark. Then the cylinder is dropped onto hard wood surface from a height of 1 inch at 2 second interval. The volume of the powder is measured. Then powder is weighed. This is repeated to get average values. The bulk density is calculated by using the below given formula.

$$\text{Bulk density} = \frac{\text{mass of the herbal powder shampoo}}{\text{volume of the herbal powder shampoo}}$$

### 4. Tapped density

The tapped density is an increased bulk density attained after mechanical tapping a container containing the powder sample. After observing the initial powder volume or mass, the measuring cylinder or vessel is mechanically tapped for 1 min and volume or mass reading are taken until little further volume or mass change was observed. It was expressed in gram per cubic centimeter ( $\text{g}/\text{cm}^3$ )

## (III) Physicochemical evaluation

- pH :-** The pH of 10% shampoo solution in distilled water was determined at room temperature 25° c. the pH was measured by using digital pH meter.
- Washability:-**Formulation was applied on the skin then ease and extend of washing with water were checked manually.
- Solubility:-**Solubility is defined as the ability of the substance to soluble in a solvent. 1 gram of the powder is weighed accurately a transferred into a beaker containing 100 ml of water. This was shaken well and warmed to increase the solubility. Then cooled and

filter it, the residue obtained is weighed and noted.

- Loss of drying:** - Loss drying is the loss of mass expressed in percent m/m. two gram of powder was weighed accurately and transferred into a dry Petri dish. The Petri dish is placed in a desiccator for 2 days over calcium chloride crystals. Then the powder was taken and weighed accurately to find out the weight loss during drying.

### 5. Extractive values

#### **Determination of alcohol soluble extractive:**

5gram of the each air dried herbal shampoo powder was weighed and macerated with 100 ml of Alcohol of the specified strength in a close flask for 24 hours, shaken frequently during six hours and allowed to stand for eighteen hours. Filtered it by taking precautions against loss of solvent, 25 ml if the filtrate was evaporated to dryness in a tare flat bottomed shallow dish, and dry at 105 °C, to constant weight and weighed. The percentage of alcohol-soluble extractive with reference to air –dried drug was calculated.

#### **Determination of water soluble extractive:**

Proceeded as directed for the determination of alcohol-soluble extractive, using chloroform water instead of ethanol. The percentage of water soluble extractive was calculated for each sample.

## (IV) Ash value

- Total ash content:** - Ash value is calculated to determine the inorganic content which is characteristic for an herb. About 2 gm of powder drug was taken in silicon dish previously ignited and weighed. Temperature was increased by gradually increasing the heat not exceeding to red color. After complete burning, ash is cooled and weighed.

**Acid insoluble ash:-**Acid insoluble ash was calculated by boiling above obtained ash with 25 ml dil. HCL for 5min, insoluble matter was collected in gooch crucible, washed with hot water, ignited weighed.

**Table 1: Herbal ingredients used in powder shampoo formulation**

Constituents	Biological source/family	Uses	Quantity sample
Bahera	Dried ripe fruits of terminalia balerica (combretaceae)	Provides nutrition to growing hair	25%
Harda (myrobalan)	Dried ripe fruits of terminalia chebula (combretaceae)	Hair growth promoter	20%
Amla	Dried ripe fruits of embelica officinalis (euphorbiaceae)	Hair growth promoter	20%
Shikakai	Dried seeds of <i>Acacia rugate</i> (Leguminesue)	Foam base	15%
Ritha	Sapindus mukorossi	Detergent foaming property	10%
Aloe	Aloe vera	Moisturizer	5%
Neem	Dried leaves of <i>Azadirachta indica</i> (Miliaceae)	Antiseptic Antibacterial	1%
Tulsi	Dried leaves of <i>Ocimum santum</i> (Labiataeal)	Antibacterial	1%
Henna	Dried leaves of <i>Lawsonia inermis</i> (Lythraceae)	Conditioner	1%

**(V) Dirt dispersion**

Two drops of 1 % each shampoo powder were added in a largest test tube contain 10 ml of distilled water. 1 drop of Indian ink was added; the test tube was stoppered and shaken for 10 times. The amount of ink in the foam of was estimated as None, Light, Moderate, or Heavy.

**(VI) Moisture content determination**

10 g of each herbal shampoo powder was weighed in a tare evaporating dish and kept in hot air oven at 105 °c. Repeated the drying until the constant weight loss was observed after the interval of 30 minutes. The moisture content was calculated for each sample.

**(VII) Foaming index**

One gram of the powder was weighed and accurately and transferred into 250 ml conical flask containing 100 ml of boiling water. Then it is warmed gently for 30 minutes, cooled and filtered and make up the volume to 100 ml in stander volumetric flask. This extract is taken in

10 test tubes in a series of successive portion of 1, 2, 3....10 ml and remaining volume is made up with water to 10 ml. Then the test tubes were shaken in longwise motion for 15 second at speed of 2 frequencies per second. Then the tubes are allowed to stand for 15 minutes. The height of the foam was measured. The Foaming index =1000/a.<sup>20-22</sup>

**(VII) Skin /eye irritation test**

The eye and skin irritation tests revealed that the herbal shampoo powder shows no harmful effect on skin and eye. This is due to the absence of synthetic surfactants. Most of the synthetic surfactants produce inflammation of the eyelid and corneal irritation. But in this formulation of herbal shampoo powder, the uses of all ingredients are obtained naturally. So it does not produce any harmful effect on skin and eye.<sup>23</sup>

**RESULTS**

Evaluation results of polyherbal shampoo powder are tabulated as follow.

**1) Organoleptic evaluation****Table 2: Organoleptic evaluation**

Sr. no	Organoleptic evaluation	Result
1	Colour	Yellowish
2	Odour	Slight pleasant
3	Taste	Characteristic
4	Texture	Fine smooth

## 2) General powder characteristics

Table 3: General powder characteristics

Sr. no	General powder characteristic	Results
1	Particle size	20-25 $\mu\text{m}$
2	Angle of repose	34 <sup>o</sup>
3	Bulk density	0.53
4	Tapped density	0.75

Table 4: Calculation for Angle of repose of herbal shampoo

Method	Height of cone (cm)	Radius of cone (cm)	$\tan \theta = (h/r)$	Average $\tan \theta$	$\theta = \tan^{-1} (h/r)$	Flow property
Funnel method	2	3	0.67	0.67	34 <sup>o</sup>	Good flow

Table 5: Bulk density calculation of herbal shampoo

S. No.	Bulk of volume (ml)	Mass of the Powder (g)	Bulk density (g/ml)	Average bulk density (g/ml)
1	50	26.5	0.53	0.53
2	50	26.5	0.53	
3	50	26.5	0.53	

Table 6: Tapped density calculation of herbal shampoo

S. No.	Tapped volume	Mass of the powder	Tapped density (g/ml)	Average tapped Density (g/m)
1	35	26.5	0.75	0.75
2	35	26.5	0.75	
3	35	26.5	0.75	

## 3) Physicochemical Evaluation

Table 7: Physicochemical property

S. No.	Physicochemical evaluation	Results
1	PH	5.5
2	Washability	Easily washable
3	Skin / eye irritation	No harmful effect on the skin
4	Foaming capacity	Good foaming
5	Extractive values: a) Alcohol soluble b) water soluble	50% 48%
6	Ash value: a) Total ash value b) Acid insoluble ash	5% 2.5%
7	Dirt dispersion	Moderate
8	Moisture content determination	3.89%
9	Solubility	Soluble(sparingly)

Table 8: Foaming Index Calculation for Herbal Shampoo powder

S. No.	Time interval	Herbal Shampoo Powder		
		Liquid	Foam	% Foaming Capacity
1.	0 min	30 ml	50 ml	166.66
2.	5 min	35 ml	40 ml	114.28
3.	30 min	44 ml	44 ml	100
4.	60 min	50 ml	40 ml	80
5.	Average % Foaming Capacity	115.24 %		

## DISCUSSION

Medicinal plants used in the formulation of herbal shampoo were found as rich source of novel drugs. These plants were Henna, Reetha, Tulsi, Neem, Amla, Shikakai, China rose, Lemon, Aloe, Peppermint had been reported for hair growth and conditioning. The various quality control parameters were checked. All parameter gives favourable result. The result obtained on present study shows that the active ingredients of these drugs when incorporated in shampoo gives more stable products with good aesthetic appeal. The pH of the shampoo has been shown to be important for improving and enhancing the qualities of hair, minimizing the irritation to the eyes and stabilizing the ecological balance of the scalp. The current trend to promote shampoos of lower pH is one of the minimizing damage to the hair. Such results are estimated out of a formulation to establish strong results for the usage and good results of the product. Though the product is in dry form inspite has wonderful wetting capacity and being dry is very good for the storage.

## CONCLUSION

A survey of global hair care market trends indicates that consumer use of herbal products has significant increased over the past years. The factors like UV radiations, use of harsh chemical products have direct and indirect impact on the hair. To overcome this problems the present study has the best undertaken to design an herbal shampoo which will not only give hair protection but also conditioning effect, shine and manageability. The present work focuses on the potential of herbal extracts from cosmetic purposes. Hence we conclude that the formulation of polyherbal shampoo powder is effective in reducing dandruff without irritation, less adverse effect and better conditioning effect. 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.

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