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FORMULATION AND EVALUATION OF HERBAL SHAMPOO

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ABSTRACT

Shampoos are cosmetic preparations that are used to wash hair and scalp, packed in a convenient way for usage. The primary function of the shampoo is to clean the hair, accumulated sebum, scalp debris and residue of hair. A shampoo formulation must be safe and efficient for a longtime use. The use of polyherbal cosmetics is raising as they have few side effects. The main objective of our polyherbal shampoo formulation was to eliminate the harmful effects which are caused due to the synthetic shampoos available in the market. The formulated polyherbal shampoo powder consists of Ritha, Shikakai, Nagarmotha, Neem leaf, Henna, Hibiscus flowers. All these materials were collected shade dried and was made into powder. They were mixed together in respective ratios and the following evaluation tests were carried out – Organoleptic characteristics, powder characteristics, physicochemical evaluation, dirt test, foaming capacity, wetting time, etc. As the selected ingredients have been used since long time the present investigation will certainly help in standardization of quality and purity of polyherbal shampoo powder.

Keywords – Polyherbal, Shampoo, Formulation, Evaluation, Quality.

1. INTRODUCTION

Since the ancient era people use herbs for cleaning, beautifying and to manage hair because hair is considered as the integral part of human beauty [1]. The main constituent of hair is keratin. Keratin is a remarkable protein which is resistant to wear and tear. As years passed by, synthetic agents have taken a dominating role in the formulation industries, but now a day, due to the less expensive and reduced side effects of the natural products people are getting attracted towards natural products because of the harmful effect on the skin, hair and eyes caused by synthetic products [2]. Shampoos are not only used for cleansing hair but also used to maintain the hair – soft, shiny, thicker, longer and to remove the oiliness from the hair. Many types of shampoos are available like powder shampoo, clear liquid shampoo lotion shampoo, solid gel shampoo, medicated shampoo, liquid herbal shampoo, etc. [3, 4].

Depending upon the type and nature of ingredients used it may be simple shampoo, anti-dandruff shampoo, anti-septic shampoo and shampoos containing vitamins, amino acids, protein hydrolyses called as nutritional shampoo [5].

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.

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 hydrolyze [6].

2. MATERIALS AND METHODS

2.1 Collection of Plant Material

All the plant materials were collected from the Medicinal Herbal Garden of Dr. Vedprakash Patil College of Pharmacy, Aurangabad and some herbs collected in botanical garden from Dr. Babasaheb Ambedkar Marathwada University, Aurangabad and few from the market. These plant materials were shade dried, powdered and stored in air tight containers until it was used for further studies.

2.2 Formulation of Powder Shampoo

The formulated shampoo powder is not only safer than the synthetic agent containing shampoos, but it also reduces dandruff, hair fall and makes hair stronger. The above ingredients used also acts as:

a. Ritha - antibacterial, antifungal, cleanser, exfoliate, insect repellent, etc.,
b. Neem leaf - astringent, antiseptic, antibacterial, antiviral, itching, scabies, boils, swelling and used for head lice infestation.
c. Henna - works as a cooling agent and natural dye.
d. Shikakai - act as a foam base.
e. Hibiscus - helps in hair growth.
f. Nagarmotha - It is used as fragrance [6-9].

All the ingredients mentioned in Table 1 were weighed accurately, passed through sieve no. 125 and then mixed geometrically [10] and stored in a well closed container for further evaluation. Herbal shampoo was prepared by uniformly powdering and mixing in ascending order by weight with continuous trituration.

Table 1: Formulation of powder shampoo

Sr.No.	Ingredients	Uses	Quantity for 100gms.
1.	Ritha Fruit	Detergents	20%
2.	Neem Leaf	Antidandruff	15%
3.	Shikakai	Foam base	15%
4.	Henna	Nourishing and Conditioning	15%
5.	Hibiscus	Hair growth	20%

2.3 Preparation Procedure of Herbal Shampoo Powder

Following steps are followed in sequential manner for formulation of herbal shampoo powder [10-14].

a. **Drying**

All the ingredients are in dried under shade and then grinded

b. **Weighing**

All the required herbal powders for shampoo preparation were weighed individually.

c. **Size reduction**

The crude ingredients were collected and these ingredients were size reduced using hand driven mixer individually.

d. **Mixing**

All these fine ingredients were mixed thoroughly by stainless steel spatula to form a homogenous fine powder.

e. **Sieving**

Then this fine powder was passed through sieve no: 125, to get the sufficient quantity of fine powder.

f. **Packing and labeling**

Then it was packed and labeled suitably.

2.4 Evaluation of Shampoo Powder

Prepared formulations of shampoos were subjected to following evaluation parameters.

2.4.1 Organoleptic Evaluation

The sample was taken randomly Organoleptic evaluation on the parameters like colour, odour, taste and texture were 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. [11].

2.4.2 General Powder Characteristics

General powder characteristics include evaluation of parameters that affect the external property like flow property, appearance, packaging criteria, etc. [12,13].

i) 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.

ii) Angle of Repose

The flow property of the powder was determined by funnel method; a distance of 2cm was maintained between the graph sheet and the bottom of the funnel, flowing was continued till the top of the heap touches the bottom of the funnel tip.

The angle of repose (θ) can be calculated by using the formula.

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

Where, θ – Angle of repose,

h – height of the heap,

r – Radius of the base

iii) Bulk Density

A 100ml graduated cylinder was taken and 5gm of powder was added to the graduated cylinder. This was then kept in the bulk density apparatus and bulk density was calculated. It is expressed in g/cm^3. This is a very important property for packaging and to get uniformity of the product.

iv) Tapped Density

5gms of powder was taken and placed in 100ml graduated cylinder and was tapped mechanically for 1 minute and volume was noted until little change in volume was observed. It expressed in g/cm^3.

2.4.3 Physicochemical Parameter

A. Ash Value

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 [14].

Determination of Acid Insoluble Ash

The total ash was taken and was boiled for 5 minutes with 25ml of dilute Hydrochloric acid and filtered, the insoluble matter that retained over the filter paper was washed with hot water and the acid insoluble ash was calculated.

B. Moisture Content Determination

10g of sample was placed in a tarred evaporating dish and kept in hot air oven for 105^0C. The weight loss was observed at an interval of15minutes until constant weight was obtained.

C. pH

1g of sample was taken and dissolved in 10ml of water and pH was checked with the help of pH meter.

2.4.4 Cleaning Action

5g of wool yarn/ cotton ball was taken and placed in grease, the same was then placed in a 200ml of water containing 1g of sample in a bottle, and the bottle was shaken for4minutes. The solution was removed and sample was taken out, dried and weighed. The amount of grease removed was calculated using the formula

Percentage of detergent powder = 100(1-weight of grease in test sample/ weight of grease in control sample)

2.4.5 Foaming Capacity

2g of shampoo powder was taken in a 250ml graduated cylinder, 50ml of water was added and shaken for 10 times. The total volume of foam contents after 1 minute shaking was recorded at an interval of 5 minutes [15-20].

2.4.6 Dirt Dispersion

1% of shampoo (1g of sample in 10 ml of water) was taken. 1 drop of methylene blue was added; the test tube was stoppered and shaken for 10 times. The amount of methylene blue in the foam was estimated.

2.4.7 Wetting Time

A canvas was cut into 1 inch diameter discs having a weight of 0.45g. The disc was made to float on the surface of 1% shampoo solution and the time required for the disc to sink was noted as the wetting time.

2.4.8 Nature of Hair after Wash

Nature of hair after wash was done by applying a small quantity of the powder on hair and then washed.

2.4.9 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.

3. RESULTS AND DISCUSSION

3.1 **Organoleptic Evaluation**

These parameters were done manually and the results have been tabulated in Table 2.

3.2 General Powder Characteristics

The particle size was found to be 20-25µm, Angle of repose was 28°±1.03, Bulk density and Tapped density was found to be 0. 454g/cc and 0.625g/cc respectively.

Table 2: Evaluation Results

Sr. No.	Evaluation parameters		Observation
1.	Organoleptic evaluation	Colour	Yellowish brown
		Odour	Slightly pleasant
		Taste	Bitter
		Texture	Fine and Smooth
2.	General powder characters	Particle size	20 – 25 µm ±
		Angle of repose	28° ± 1.03
		Bulk density	0.454 g/cc
		Tapped density	0.625 g/cc
3.	Physicochemical evaluation	Ash value	
		1. Total ash	4 %
		2. Acid insoluble ash	1.77 %
		Moisture content	3.50 %
		pH	6.62
4.	Cleaning action		Moderate
5.	Foaming		Good foaming
6.	Dirt dispersion		Moderate
7.	Wetting time		2 min. 14 sec
8.	Nature of hair after washing		Soft, manageable

Table 3: Calculation for Angle of Repose of Polyherbal Shampoo Powder

Method	Height of cone (cm)	Radius of cone (cm)	tan θ = (h/r)	Average tan θ	$\theta = \tan^{-1}$ (h/r)	Flow property
Funnel method	2	3.65	0.55	0.55	28.81 °	Good flow

3.3 Physicochemical Evaluation

- The total Ash value and acid insoluble ash value was found to be 4 % w/w and 1.77 % w/w respectively.
- The moisture content was 3.50% and the pH of the shampoo was found to be 6.62 ± 1.
- Cleaning action of the formulation was found to be 32 ±0.32 and the shampoo gave good foam which will be with good compliance.
- Dirt dispersion capacity of the shampoo was found to be moderate.
- The shampoo had 2min 14sec of wetting time.
- The nature of hair after wash was found to be soft and manageable.

4. DISCUSSION

Medicinal plants used in the formulation of herbal shampoo were found as rich source of novel drugs. These plants were Henna, Reetha, Cypriol (Nagarmotha), Neem, Hibiscus flower, Shikakai had been reported for hair growth and conditioning. The various quality control parameters were checked.

All parameter gives favorable 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 damages 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 inspire has wonderful wetting capacity and being dry is very good for the storage.

5. 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 these 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.

Our formulation was carried out based on the folklore claims of the herbs used and also to develop few parameters like quality and purity of herbal shampoo. The investigation of polyherbal shampoo powder was carried out for its standardization and shampoo powder. The evaluation parameters like Organoleptic evaluation, General powder Characters, Physicochemical Evaluation, Cleaning action, foaming, Dirt dispersion, Wetting agent, Nature of hair after wash was carried out and was found to be within the standard range.

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