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Formulation and Evaluation of Powder Herbal Shampoo

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ABSTRACT

Day by day, dependency of people is rising on herbal or Ayurveda formulation not only for chronic ailments but also for number of acute problems. The assurance of therapy with minimal side effects has proven Ayurveda formulation to be promising for cosmetic use too, so it's the challenge to prepare a complete herbal shampoo in powder form. This study aims to formulate a self preserving shampoo powder containing natural ingredients with emphasis of safety and efficacy, will avoid the risk posed by chemical ingredients. The formulated shampoo powders contains Amla fruit, Hibiscus Leaf, Neem leaf, Shikakai fruit, Aloe leaf, Henna Leaf, Thulasi Leaf, Menthi Powder, Thymus vulgaris. All shampoo powders were evaluated for organoleptic, powder characteristics, physicochemical evaluation, dirt dispersion, foaming capacity, wetting time etc. As the selected drugs being used since long time as single drug or in combination, present investigations will further help to establish a standard formulation and evaluation parameters, which will certainly help in the standardization for quality and purity of such type of herbal powder shampoos. After complete study it is concluded that all the three powder shampoos shown good qualities of shampoo. The PHS-II of herbal shampoo powder contain all good characters of an ideal shampoo and it was found to be harmless, more effective and economic.

Keywords: Shampoo, herbal, powder and evaluation

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1. Introduction

Hair is one of the vital parts of the body derived from ectoderm of the skin and is protective appendages on the body and considered accessory structure of the integument along with sebaceous glands, sweat glands and nails. They are also known as epidermal derivatives as they originate from the epidermis during embryological development.

Hair is an important part of the overall appeal of the human body .Hair is one of the external barometers of internal body conditions. Shampooing is the most common form of hair treatment. The primary function of shampoo is aimed at cleansing of the hair necessitated due to accumulated sebum, dust, scalp debris etc. Various shampoo

formulations are associated with hair quality, hair care habit and specific problems such as treatment of oily hairs, dandruff and for androgenic alopecia. Shampoos are liquid, creamy or gel like preparations. The consistency of the preparation depends on the inclusion of traditional soaps saturated with glycerides and natural or synthetic fatty alcohols or the thickening agents (e.g. gum, resin and PEG). Indian women use herbals such as shikkakai and thulasi that are natural cleansing agents without harmful effects. Hair is one of the external barometers of internal body conditions. Shampooing is the most common form of hair treatment. The primary function of shampoo is aimed at cleansing of the hair necessitated due to accumulated sebum, dust, scalp debris etc. Various shampoo formulations are associated with hair quality, hair care habit and specific problems such as treatment of oily hairs, dandruff and for androgenic alopecia. Shampoos are liquid, creamy or gel like preparations. The consistency of the preparation depends on the inclusion of traditional soaps saturated with glycerides and natural or synthetic fatty alcohols or the thickening agents (e.g. gum, resin and PEG). Indian women use herbals such as shikkakai and reetha that are natural cleansing agents without harmful effects. A shampoo is a preparation of a surfactant in a suitable form -liquid, solid or powder-which when used under the specific conditions

will remove surface grease, dirt and skin debris from the hair shaft without adversely affecting the user.

2. Materials and Methods

The different parts of the plants were selected for the study having hair care property. The plants are Amla Fruit (*Embelica Officinalis*), Hibiscus Leaf (*Hibiscus rosea*), Neem leaf (*Azadirachta indica*), Shikakai fruit (*Acacia concinna*), Aloe leaf (*Aloe barbadensis*), Henna Leaf (*Lawsonia inermis*), Menthi Powder (*Trigonella foenum gracecum*), Tulsi (*Ocimum sanctum*) and Thymus Vulgaris (*Thymus Vulgaris* Linn). The powder of Amla fruit, Hibiscus Leaf, Neem leaf, Shikakai fruit, Aloe leaf, Henna Leaf, Menthi Powder, Tulsi, Thymus Vulgaris were collected from the local market. The raw materials collected were given with their respective biological source and uses in Table No.1 ingredients in the hair care; even they are responsible to provide the nutrition to the body. Herbs have long been associated with hair care and are often ingredients of conditioners, shampoos and rinses. The selection of active ingredients for hair care powder is often based on the ability of the ingredient to prevent damage to the skin as well as to improve the quality of the skin by way of cleansing, nourishing and protecting the skin.

Table 1: List of Materials

SN	Ingredients	Biological source/ family	Uses
1	Amla Fruit	Dried ripe fruits of <i>Embelica Officinalis</i> (<i>Euphorbiaceae</i>)	Darkening of hairs & hair growth promoter
2	Hibiscus	Dried Leaves of <i>hibiscus rosea</i> (<i>Malvaceae</i>)	Prevents hair loss
3	Neem Leaf	Dried Leaves of <i>Azadirachtha Indica</i> (<i>Miliaceae</i>)	Prevents dryness of hair & Flaking of hairs
4	Shikakai Fruit	Dried pods of <i>acacia concinna</i> (<i>Mimosaceae</i>)	Foam base & Antidandruff
5	Aloe vera Leaf	Dried Leaves of <i>aloe barbadensis miller</i> (<i>Asphodelaceae</i>)	Conditioner & moisturizing effect
6	Henna Leaf	Dried Leaves of <i>lowsonia inermis</i> (<i>Lythraceae</i>)	Growth of hair, Conditioner
7	Tulasi Leaf	Dried Leaves of <i>ocimum sanctum</i> (<i>Lamiaceae</i>)	Antibacterial activity
8	Menthi Powder	Dried Seeds of <i>trigonella foenum gracecum</i> (<i>Leguminosae</i>)	Cooling Effect
9	Thymus Vulgaris	Dried Leaves and flowering tops of garden thyme of <i>thymus Vulgaris</i> Linn (<i>Labiatae</i>)	Preservative & Fragrance

Preparation of the Herbal Shampoo Powder

All the herbal ingredients are in dry form and grinded to make fine powder by using size reduction mill and were passed through sieve no 120 to get very fine power. The required powders for shampoo preparation were accurately weighed individually using digital balance. The powders were added in to motor and pestle in the ascending order of their weights with continuous trituration to form a homogenous fine powder. The powder mixture was collected and stored in suitable plastic container and used for doing evaluation parameters.

Table 2: Composition of Powder Herbal Shampoo

S.N	Ingredients (gms)	PHS – I	PHS – II	PHS – III
1	Amla Fruit	10	15	12
2	Hibiscus Leaf	8	7	9
3	Neem Leaf	6	6	6
4	Shikakai Fruit	5	3	2
5	Aloe vera Leaf	2	1	2
6	Henna Leaf	2	2	2
7	Tulasi Leaf	4	3	4
8	Fenugreek seeds	1	1	1

9	Thymus Vulgaris	2	2	2
Total		40	40	40

Evaluation of Herbal Powder Shampoo

Prepared formulations of shampoos were subjected to following evaluation parameters.

Organoleptic Evaluation/Visual Appearance

Organoleptic evaluation for 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 were selected. The height of the foam was measured.

Foaming Index

One gram of the powder was weighed 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 100ml in standard 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 seconds at speed of 2 frequencies / second. Then the tubes are allowed to stand for 15 minutes. The height of the foam was measured.

Foaming index = $1000/a$

Dirt Dispersion

Two drops of 1% each shampoo powders were added in a large test tube contain 10 ml of distilled water. 1 drop of India 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.

Cleaning Action

5 grams of wool yarn were placed in grease, after that it was placed in 200 ml. of water containing 1 gram of each shampoo powder in a flask. Temperature of water was maintained at 35° C. The flask was shaken for 4 minutes at the rate of 50 times a minute. The solution was removed and sample was taken out, dried and weighed.

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

Surface Tension Measurement

Measurements were carried out with a 10% shampoo dilution in distilled water at room temperature. Thoroughly clean the stalagmometer using chronic acid and purified water. Because surface tension is highly affected with grease or other lubricants. The data calculated by following equation given bellow:

$$R_2 = \frac{(W_3 - W_1) n_1}{(W_2 - W_1) n_2} \times R_1$$

Where

W1 is weight of empty beaker.

W2 is weight of beaker with distilled water.

W3 is Weight of beaker with shampoo solution.

n1 is no. of drops of distilled water.

n2 is no. of drops of shampoo solution.

R1 is surface tension of distilled water at room temperature.

R2 is surface tension of shampoo solution.

Determination of 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.

Solubility

Solubility is defined as the ability of the substance to soluble in a solvent. One gram of the powder is weighed accurately and 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.

Wetting Time

The canvas was cut into 1 inch diameter discs having an average weight of 0.44 g. The disc was floated on the surface of shampoo solution of 1% w/v and the stopwatch started. The time required for the disc to begin to sink was measured acutely and noted as the wetting time.

Washability

Formulations were applied on the skin and then ease and extent of washing with water were checked manually.

Viscosity:

The viscosity of the shampoos was determined by using Brookfield Viscometer set at different spindle speeds from 0.3 to 10 rpm. The viscosity of the shampoos was measured by using spindle T95. The temperature and sample container's size was kept constants during the study.

3. Results and Discussion

An attempt was made in the present investigation with an aim to formulate and evaluate powder herbal shampoo using herbal ingredients. The primary requirement for the preparation is aimed at cleansing of the hair necessitated due to accumulated sebum, dust, scalp debris etc. Three formulations were prepared, Medicinal plants used in the formulation of herbal shampoo were found as rich source of novel drugs, which contain Amla for Darkening of hairs & hair growth promoter, Shikakai as Foam base & Antidandruff agent, Aloe vera powder as a Conditioner & moisturizing effect, Henna powder for Growth of hair, Conditioner and Tulasi Leaf as an Antibacterial activity. The various quality control parameters were checked. All parameter gives favourable result.

Table 3: Preformulation Studies of Powder Blend

S. No	Formulation	Bulk density (gm/cm ³)	Tapped density (gm/cm ³)	Angle of repose	Cleansing Action	Surface Tension (dynes/cm)
1.	PHS-I	0.39 ± 0.08	0.64 ± 0.01	28°88'± 0.84	24.21± 0.03	48.80±0.02
2.	PHS-II	0.45 ± 0.04	0.72 ± 0.02	29°39'± 0.52	33.61±0.05	61.37±0.62
3.	PHS-III	0.48 ± 0.05	0.66 ± 0.03	26°85'±0.91	32.51±0.09	60.19±0.12

Table 4: Physicochemical Properties

S. No	Formulation	pH	Washability	Solubility	Ditrdispersion	Wettability
1.	PHS-I	6.4	Easily Washable	Soluble	Moderate	14.66±0.88
2.	PHS-II	7.3	Easily Washable	Soluble	Moderate	23.66±0.88
3.	PHS-III	6.8	Easily Washable	Soluble	Moderate	11.66±0.09

Table 5: Foam Index

Formulation		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Height of Foam	PHS – I	0	0.2	0.7	0.8	1.0	1.5	1.6	1.7	2.0	2.5
	PHS – II	0	0.3	0.8	0.9	1.1	1.4	1.7	2.0	2.2	2.6
	PHS – III	0	0.1	0.3	0.4	0.5	0.7	1.0	1.3	1.5	2.0

Table 6: Organoleptic Evaluations

S. No	Formulation	Organoleptic Evaluations			
		Color	Odor	Nature	Texture
1	F- I	Grey	Acceptable	Coarse	Smooth
2	F – II	Light Green	Acceptable	Fine	Smooth
3	F – III	Green	Acceptable	Fine	Smooth

Table 7: Viscosity

Speed (rpm)	PHS – I		PHS – II		PHS – III	
	%Tor	Viscosity	%Tor	Viscosity	%Tor	Viscosity
0.3	15.31	95733.33	--	--	13.35	83433.33
0.5	21.90	82150.00	16.18	60765.00	19.61	73583.33
1	32.86	54150.00	22.75	42666.66	27.46	51516.67
1.5	40.73	50916.67	26.66	33350.00	32.35	40450.00
2	51.70	38778.33	31.96	23978.33	38.46	28851.66
2.5	67.63	25425.00	38.98	14645.33	47.03	17651.66
10	84.53	15775.00	46.40	8541.00	54.28	10741.66

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. All the formulations showed good blend properties, cleansing action, surface tension and viscosity for prepared powder herbal shampoo. The results of organoleptic parameters such as colour, odor, texture and nature for all the formulations has shown acceptable colour, odor and smooth texture to the shampoos. All the formulations show the pH within the range, which shows that it doesn't cause any irritation or sensitize the skin. The prepared shampoo is easy washable with portable water and has the tendency to remove the dirt due to the surfactant property. Though the product is in dry form inspite has wonderful wetting capacity and being dry is very good for the storage.

4. Conclusion

This study presents a number of plant drugs with proven efficacy as in hair care preparations. In present investigations was carried out to formulate the herbal shampoo powder preparations based upon traditional knowledge and to develop few parameters for quality and purity of herbal powder shampoo. From this investigation it can be concluded that the formulation PSH - II of herbal shampoo powder contain all good characters of an ideal

shampoo and it was found to be harmless, more effective and economic.

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