ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

FORMULATION AND EVALUATION OF HERBAL SHAMPOO POWDER

Miss Shweta S. Patil*, Mr. Yuvraj J Mane, Mr. Shrinivas K Mohite.
Department of Quality Assurance, Rajarambapu College of Pharmacy,Kasegaon. Tal.Walwa, Dist Sangli 415404, M.S. India

Manuscript Info

Manuscript History:

Received: 15 January 2015
Final Accepted: 22 February 2015
Published Online: March 2015

Key words:

Herbal Shampoo, Formulation, Evaluation

Corresponding Author

Miss Shweta S. Patil

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 consumers. A more radical approach in reducing the synthetic ingredients is by incorporating natural extract 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, i.e., 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, products 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, number of skin and hair disorders are encountered. This herbal shampoo was formulated using natural ingredient like *Azadirachta indica* (neem), *Acacia concinna* (shikakai), *Sapindus mukorossi* (reetha), *Ocimum sanctum* (tulsi), *Aloe vera* (aloe), *Hibiscus rosa sinensis* (china rose), *Embelica officinalis* (amla), *Lawsonia inermis* (henna),*Citrus lemon* (lemon), *Mentha piperita* (peppermint) 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.

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).[20] Indian women use herbals such as *shikkakai* and *reetha* 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.

Ideal characters of shampoo [18]

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

Composition of shampoo [18]

_ Surfactant
_ Antidandruff agents
_ Conditioning agents
_ Pearlescent agents
_ Sequestrants
_ Thickening agents
_ Colours, perfumes and preservatives.

Types of Shampoo

Shampoos are of the following types:

- Powder Shampoo
- Liquid Shampoo
- Lotion Shampoo
- Cream Shampoo
- Jelly Shampoo
- Aerosol Shampoo
    - Specialized Shampoo
    - Conditioning Shampoo
    - Anti-dandruff Shampoo
    - Baby Shampoo
    - Two Layer Shampoo

In today fast life peoples don't have time to look on there physique also. The problems of hair : Hair falling, White hair, Dandruff, and Split end hair etc. The reasons of hair problem are tension**,** scalp infection**,** hormones disturbances, lower vitamin, food, minerals**,** and large chemical shampoo use. To overcome all this problem was the main intension of our project. So we prepared polyherbal antidandruff powder, which is an multipurpose powder for hair treatment. Cleanliness of hair and scalp are among the most important personal life consideration today.[20]

MATERIALS AND METHODS:-

The herbal shampoo powder was formulated using following natural ingredients:-

Table no. 1 Herbal drugs used in the formulation shampoo powder. [9,12,13]

Common	Latin name	Uses	Quantity

name			
Henna	Lawsonia Inermis	Conditioning agent, provide body and bounce to the hair, hair growth	5 %
Neem	Azadirachta indica	Antimicrobial agent	5 %
Tulsi	Ocimum sanctum	Antimicrobial agent	5 %
Amla	Embelica officinalis	Promote hair growth, prevent premature graying and control dandruff	15 %
Shikakai	Acacia concinna	Natural cleansing agent, detergent,	15 %
Aloe	Aloe vera	Moisturizer	10 %
Lemon	Citrus lemon	Prevent hair loss	10 %
Peppermint	Menthe piperita	For its cooling properties	5 %
China rose	Hibiscus rosa sinensis	Improves hair growth, prevent premature grayness	15 %
Reetha	Sapindus mukorossi	Detergent, foaming property	15 %

Selected herbal drugs in dried form were purchased from the authenticated agencies.

Preparation of the 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 [14,15,20] :-

(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 characteristis: [14, 19]

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.

Particle size

Particle size is a parameter, which 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.

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 (θ) can be calculated by using the formula.

Open - ended cylinder method

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 methods, 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

Bulk density

Bulk Density is the ratio between the given mass of a powder and its bulk volume. Required amount of the powder is dried and filled in a 50 ml measuring cylinder up to 50 ml mark. Then the cylinder is dropped onto a hard wood surface from a height of 1 inch at 2 second intervals. The volume of the powder is measured. Then the powder is weighed.

This is repeated to get average values. The Bulk Density is calculated by using the below given formula.

$$\text{Bulk Density} = \frac{\text{Mass of the herbal powder shampoo}}{\text{Volume of the herbal powder shampoo}}$$

Tapped density

The tapped density is an increased bulk density attained after mechanically 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 readings are taken until little further volume or mass change was observed. It was expressed in grams per cubic centimeter (g/cm3).

III) Physicochemical evaluation [14,15,20]

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

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

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.

Loss on drying [17]

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

Extractive values [17]

Determination of alcohol soluble extractive

5 g of the each air dried herbal shampoo powder was weighed and macerated with 100 ml of Alcohol of the specified strength in a closed flask for twenty-four hours, shaked frequently during six hours and allowed to stand for eighteen hours. Filtered, by taking precautions against loss of solvent, 25 ml of the filtrate was evaporated to dryness in a tare flat bottomed shallow dish, and dry at 105 0C, to constant weight and weighed. The percentage of alcohol-soluble extractive with reference to the 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.

Ash value[17]

Total ash content

Ash value is calculated to determine the inorganic contents which is characteristic for a 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 colour. 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 and weighed.

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.

Moisture content determination
10 g of each herbal shampoo powder was weighed in a tare evaporating dish and kept in hot air oven at 105^0C. Repeated the drying until the constant weight loss was observed after the interval of 30 minutes. The moisture content was calculated for each sample.

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.

Stability Study
Stability and acceptability of Organoleptic properties (odor and color) of formulations during the storage period indicated that they are chemically and physically stable

Nature of hair after washes
Nature of hair after wash can be done by collecting the responses of volunteers.

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 100 ml 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

Swelling index
The swelling index is the volume in milliliters occupied by one gram of a drug, including any adhering mucilage, after it has swollen in an aqueous liquid for 4 hour. Accurately weighed 1 g of the powder and transferred it into glass stopper measuring cylinder containing 25 ml of water. Then it is shaken thoroughly at every 10 minutes for 1 hour. After that it was kept for 3 hours at room temperature. The volume was measured in ml.

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.

RESULT :-

Evaluation of polyherbal shampoo powder

1) Organoleptic evaluation:-

Table no 2: Organoleptic evaluation

Sr	Organoleptic	Result

no.	evaluation	
1	Colour	Yellowish green
2	Odour	Slight pleasant
3	Taste	Characteristics
4	Texture	Fine smooth

2) General powder characteristics:-

Table no 3: General powder characteristics

Sr no	Powder characteristics	Result
1	Particle size	25-20 micrometer
2	Angle of repose	a) $34^0 9`$ b) $31^0 3`$
3	Bulk density	0.354
4	Tapped density	0.340

a: Funnel Method; b: Open ended cylinder method

Table no 4 : Angle of Repose calculation of herbal powder

Sr no	Method	Height of cone (cm)	Radius of cone (cm)	tan θ = (h/r)	Average tan θ	θ = tan -1 (h / r)	Flow property
1	Funnel Method	2.7 2.6 2.6	3.9 3.8 3.8	0.692 0.684 0.684	0.686	$34^0 9`$	Good flow
2	Open ended cylinder Method	2.5 2.3 2.4	4.2 3.7 3.9	0.595 0.621 0.615	0.621	$31^0 3`$	Good flow

Table no.5 : Bulk density calculation of herbal powder.

Sr no.	Bulk volume (ml)	Mass of the powder (g)	Bulk density (g/ml)	Ave bulk density(g/ml)
1	45	16.2	0.36	
2	46	16.2	0.352	0.354
3	46	16.2	0.352	

Table no 6 : Tapped density calculation of herbal powder

Sr no.	Tapped volume	Mass of the powder	Tapped density (g/ml)	Ave tapped density (g/ml)
1	50	17.6	0.343	
2	50	17.6	0.340	0.340
3	50	17.6	0.337	

Table no 7 : Physicochemical Property

Sr no.	Physiochemical evaluation	Result
1	pH	5.5
2	Washability	Easily washable
3	Solubility	Soluble
4	Skin / Eye irritation	No harmful effect on the skin
5	Foaming capacity	Good foaming
6	Extractive values	

	a) Alcohol soluble b) water soluble	14.07 % 11.4 %
7	Ash value a) total ash content b) acid insoluble ash	 3.21 % 1.46 %
8	Dirt dispersion	Moderate
9	Moisture content determination	2.01 %
10	Wetting time	147
11	Stability	Stable
12	Nature of hair after washes	Soft manageable

Table no 8: Foaming index calculation for herbal powder

T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
0.8	0.7	0.7	0.9	0.5	0.6	0.9	0.8	1	0.8

T1 - T10 Test tube numbers 1 to 10

foaming index =1000/a

=1000/9

= 111.1%

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 a 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.

REFERENCES:-

1) Ali Heyam Saad, Rasool bazigha Kadhim. Formulation and development of herbal shampoo from *Ziziphus spina* leaves extract. International Journal of Research in Ayurveda & Pharmacy 2(6); 2011: 1802-1806.
2) Sachin Dubey, Neelesh Nema, Nayak S. Preparation and evaluation of herbal shampoo powder. Ancient Science of Life 26(1); 2004: 38-44.
3) Sutar Manisha, Deshmukh Swati, Chavan Manisha, Singh Sonia. Preparation and evaluation of polyherbal shampoo powder. International Journal of Pharmacy and Biological sciences 392); 2013: 151-159.
4) Gholamreza Dehghan Noudeh, Fariba Sharififar, Payam Khazaeli, Ehsan Mohajeri, Javad Jahanbakhsh. Formulation of herbal conditioner shampoo by using extract of fenugreek seeds and evaluation of its physicochemical parameters. African Journal of Pharmacy and Pharmacology 5(22); 2011: 2420-2427.

5) Mohamed Halith S, Abirami A, Jaya prakash S, Chitra Karthikeyini, Kulathuran K, Mohamed Firthouse PU. Effect of *Ocimum sanctum* and *Azadiracta indica* on the formulation of antidandruff herbal shampoo powder. Scholars Research Library 1(2); 2009: 68-76.
6) Swati Deshmukh, Bindurani Kaushal, Shweta Ghode. Formulations and evaluation of herbal shampoo and comparative studies with herbal marketed shampoo. International Journal of Pharma and Bio Sciences 3(3); 2012: 638-645.
7) Naresh Gorantla, Sai Prasad K, Thimma Reddy VT, Ragadeepika J, Hajarabi T, Hindustan Abdul Ahad. Formulation and evaluation of herbal shampoo containing chamomile, rose and orange peel. Pharma Research Library: International Journal of Medicine and Pharmaceutical Research 1(2); 2013: 192-197.
8) Ashok Kumar, Rakesh Roshan Mali. Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos. International Journal of Pharmaceutical sciences Review and Research 3(1); 2010: 120-127.
9) Kokate C.K., Purohit A.P. and Gokhale S.B. "Pharmacognosy", Nirali Prakashan, Pune, Sixteenth edition, 242-253,(2001)
10) Mehta R.M, "Dispensing Pharmacy:, Vallabh Delhi, 1st edition, 108, (2000).
11) Gennaro A.R, "Remington: The Science and Practice of Pharmacy", Lipincott Williams andWilkins, Mary land, Twentieth edition. 437, (2000).
12) Evans W.C., "Treas and Evans Pharmacognosy", Harcourt Brace and Company Ltd.,Sixteenth edition, New York, 128, (1997).
13) TylerE., Brady R. and Robbers E. "Pharmacognosy", K.M. Varghese company, Bombay,1984.
14) Martin Alfred "Physical pharmacy" 4th edition Lea & febigen Philadelphia London 431-432,(1993).
15) Subrahmanyam CVS "Text book of physical pharmaceutics" Vallabh prakashan Second edition, 221-224, (2000).
16) Lachman L, Lieberman H.A. and Kanig J.L. "The Theory and Practice of Industrial Pharmacy", Varghese publishing house, Bombay, third edition, 67, (1991).
17) Kokate C.K., 'Practical phramacognosy", Vallabh Prakashan, New Delhi, Forth edition, 123,(1994).
18) Jaya Preethi P, Padmini K, Srikant J, Lohita M, Swetha K, A Review on Herbal Shampoo and its Evaluation, Asian J Pharm. Ana 3 (4), 2013,153-156.
19) Wani Snehal, Khot Nitin, Buchke Vaibhav V,Preparation and evaluation of antidandruff polyherbal powder shampoo, Pharmacophore, 5 (1), 2014, 77-84.
20) Sharma, P.P., Cosmetics- Formulation, Manufacturing and Quality control, 3rd edition, 703.