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Research Article

Formulation And Evaluation of Polyherbal Shampoo Powder

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ABSTRACT

The aim of the present work is to formulate and evaluate Polyherbal Shampoo powder. Herbs and herbal medications have been shown in studies to promote hair growth. Comparing herbal hair shampoo to synthetic formulation, which can have adverse effects like itching and localized irritation has drawn attention to these alternatives. There are several synthetic formulation available for hair loss, but they have serious adverse effects and don't provide permanent relief. Graying of the Hair is the natural phenomenon which attributes to the ageing and frequent use of shampoos which leads to use of synthetic shampoos with the increase of hazardous chemicals in the process of manufacturing. Polyherbal hair shampoo is preferred due to their advantages in contrast to synthetic one which has adverse effect on human health because of harsh chemicals. Polyherbal shampoos are prepared by using Fenugreek, Soap Nuts, Neem, Amla, Shikakai, Rose Mary, Henna.

INTRODUCTION

Polyherbal Shampoo powder

Herbal shampoos are the preparations with the use of traditional, ayurvedic herbs are meant for cleansing the hair and used for removal of oils, dirt, environmental pollution and side effects can also be avoided by using these herbal shampoos.

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 there 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 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

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concerned in stability criteria. Depending upon the nature of the ingredients they may be simple or plain shampoo, antiseptic antidandruff shampoo and nutritional shampoo containing vitamin, aminoacid.

MATERIALS AND METHODS

Table1: Polyherbal Shampoo powder Ingredients.

S.NO	Ingredients	Plant Parts Used	Picture
1	Fenugreek	Leaves	
2	Soap Nuts	Dried Fruits	
3	Neem	Leaves	
4	Amla	Dried Fruits	
5	Shikakai	Dried Fruits	
6	Rose Mary	Leaves	
7	Henna	Dried Leaves	

Materials and methods of Polyherbal Shampoo powder

Fenugreek, Soap Nuts, Neem, Amla, Shikakai, Rose Mary, Henna

Preparation Procedure of Polyherbal Shampoo powder

Following steps are followed in sequential manner for formulation of Polyherbal Shampoo powder:

Drying: All the ingredients are shade dried.

Weighing: All the required herbs for shampoo preparation were weighed individually.

Size reduction: The crude ingredients were collected and these ingredients were size reduced using mixer individually.

Mixing: All the fine ingredients were mixed thoroughly by mixer to form a homogenous fine powder.

Sieving: Then the fine powder was passed through sieve no 120 to get the sufficient quantity of fine powder.

Packing and labeling: Then the poly herbal shampoo were packed and labeled accordingly.

Method of Preparation

Herbs were collected

⇩

The collected herbs were shade dried

⇩

Crushed into powder in mortar and pestle

⇩

The powder passed through sieve no.120 to get fine powder. Flavouring agents and preservatives were added

⇩

Finally the Poly herbal shampoo powder is carried out for the evaluation tests

Table 2: Formulation of Polyherbal Shampoo Powder

S. No	Ingredients	Biological Source	Uses	Qty
1.	Fenugreek	Dried leaves of *Trigonella Foenum-graecum.*	Cooling agent, hair growth, shiny nature, antioxidants	7.5g
2.	Henna	Dried leaves of *Lawsonia inermis.*	Conditioner	2.5g
3.	Neem	Dried leaves of *Azadirachta indica.*	Antibacterial	2.5g
4.	Amla	Driedfruits of *Phyllanthus emblica.*	Hair growth promoter	2.5g
5.	Shikakai	Dried fruits of *Acacia concinna.*	Foam base	5g
6.	Soap nut	Dried fruitsof *Sapindus mukorossi.*	Foam base	5g
7.	Rose mary	Leaves of *rosmarnius officinallis.*	Flavoring agent	q.s

Evaluation of Polyherbal Shampoo Powder

The formulated herbal hair oil was subjected to physical, chemical and biological evaluation.

To evaluate the quality of prepared formulation, several quality control tests including visual assessment, physicochemical controls conditioning performance tests were performed.

Physical Appearance/Visual Inspection:

The prepared formulation was evaluated for the clarity, color, odour, and foam producing ability.

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, Characteristics evaluation for angle of repose and bulk density.

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.

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

Bulk density

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 surface from a height of 1 inch at 2 second intervals. The volume of the powder is measured.

Then the powder is weighed.

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

Tapped Density

The tapped density is an increased bulk density attained after mechanically tapping a measuring cylinder containing the powder sample. After observing the initial powder volume , the measuring cylinder is mechanically tapped for 1 min and volume readings are taken until little change was observed. It was expressed in grams per cubic centimeter (g/cm3).

Physicochemical Evaluation

p^H

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.

Wash Ability

Formulations were applied on the skin 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

Wetting Time

The canvas was cut into 1-inch diameter discs having an average weight of 0.44 g. Over the shampoo of (1% v/v) surface, the canvas paper disc was kept and the time taken for the paper to sink was measured by using the stopwatch.

Dirt Dispersion

Two drops of shampoo powder were added in a large test tube containing 10 ml of distilled water. 1 drop of India ink was added, shaken for 10 min after closing the test tube with a stopper. The volume of ink in the froth was measured and the result was graded in terms of none, slight, medium

Extractive Values

Determination of Alcohol Soluble Extractive

5 g of the 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 china dish and dry at 105^0C to constant weight and weighed. The percentage of alcohol-soluble extractive with reference to the air-dried powder was calculated.

Determination of Water Soluble Extractive

5 g of the herbal shampoo powder was weighed and macerated with 100 ml of chloroform 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 china dish and dry at 105^0C to constant weight and weighed. The percentage of water-soluble extractive was calculated.

Ash value

Total ash content

Ash value is calculated to determine the inorganic contents which is characteristic of a herb. About 2 gm of powder was taken in china dish ignited and weighed. Temperature was increased gradually, After complete heating, 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 china dish, washed with hot water, ignited and weighed.

Skin irritation test

Applied prepared shampoo on the skin and kept for 5mins and observed for redness and skin irritation

Determination Moisture Content

1g of poly herbal shampoo powder was weighed in a china 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.

Bacterial Activity

Pour plate method is used as a method of choice. 1gm of the formulated herbal shampoo powder is taken and 10ml of distilled water is added to it, 3 cavities are made on the petri plate and prepared dilution is poured in one cavity, standard in one cavity & water as a control.

Organism: E.Coli, Bacillus Subtilis Medium: Agar + Nutrient Broth Fungal Activity

Pour plate method is used as a method of choice, 0.1gm of the formulated herbal shampoo powder is taken and 10ml of distilled water is added to it, 3 cavities are made on the petri plate and prepared dilution is pored in one cavity, standard in one cavity & water as a control the process is observed after seven days.Organism: Aspergillus Niger Medium :Potato Dextrose

Preparation Of Medium Microbial Activity

Nutrient agar medium is prepared

⇩

Sterilized in an autoclave at 121degree Celsius for 20-25 mins at 20lb pressure

⇩

After sterilization the medium is allowed to cool

⇩

Then 20ml of the medium is poured in a Petri plate and allowed to cool

⇩

Then the petri plate is placed in a refrigerator

1.Sensitivity Test: The prepared herbal hair oil was applied on 1cm skin of hand and exposed to the sunlight for 4-5minutes.

2.Acid Value:

Preparation Of 0.1m KOH Solution: Accurately weigh 0.56g of KOH pellets and dissolve in 100ml of distilled water and stir continuously. The prepared solution was filled in the burette.

Preparation of Sample: Accurately weigh 5ml of oil and dissolve in 25ml of ethanol and 25ml of ether mixture and by using 1ml of phenolphthalein indicator solution and titrate with 0.1M KOH solution.

Acid value = 5.61×N/W

Where, N=No of ml of 0.1M KOH

W=Weight of oil

3.Saponification Value: Accurately weigh 1ml of oil into a 250ml of conical flask and add ethanol: ether mixture in the ratio of 2:1, 25ml of 0.5N alcoholic KOH solution was added and keep the flask aside to cool for 30 minutes. The cooled solution was titrated against 0.5N Hydrochloric acid using phenolphthalein as an indicator. Similarily the blank titration was performed without taking oil(sample). Amount of KOH in mg used was calculated.

Saponification value=28.05(b-a)/W

Where, W=weight in grams of the solution.

pH: The pH of the formulated herbal oil was determined by using pH strip using universal indicator.

Specific Gravity: Take the specific gravity bottle, rinsed it with distilled water, dry it in an oven for 15 minutes, cool and closed it with cap and weigh it (a). Now fill the same specific gravity bottle with the sample and closed it with cap and again weigh it (b). Determine the weight of the sample per milliliter by subtracting the weight (b-a).

Physical Appearance/Visual Inspection

Table5: Results of Polyherbal Shampoo Powder

S. No	Organoleptic Evaluation	Results
1	Colour	Brown

2	Odour	Pleasant
3	Texture	Smooth

1	Angle of repose	37.2
2	Bulk density	0.46
3	Tapped density	0.57

Table 6: General powder characteristics

S. no	General powder characteristic	Results

Table7: Calculation for Angle of repose of poly herbal shampoo powder

Method	Ht of cone (cm)	Radius of co ne (cm)	tan θ = (h/r)	Avg tan θ	θ = tan-1 (h/r)	Flow Property	Standard value
Funnel method	3	5.6	0.53	0.53	28.18	Excellent flow	25-30

Table8: Tapped density calculation of herbal shampoo powder

S. No	Bulk of volume (ml)	Mass of the Powder (g)	Tapped density (g/ml)	Average bulk density (g/ml)
1	44	25	0.56	0.46 g/ml
2	43	25	0.58	
3	43	25	0.58	

Table9: Bulk density calculation of herbal shampoo powder

S. No	Bulk of volume (ml)	Mass of the Powder (g)	Bulk density (g/ml)	Average bulk density (g/ml)
1	54	25	0.46	0.46 g/ml
2	54	25	0.46	
3	54	25	0.46	

p^H

The pH of formulated herbal shampoo powder for improving and enhancing the quality of hair, minimizing

irritation to eyes and stabilizing the ecological balance of scalp. The formulated shampoo is acid balanced

and was ranged 5.11 which is near to skin pH

Dirt Dispersion

Shampoo that causes the ink to concentrate in the foam is considered as poor quality, the dirt should stay in the water. Dirt that stays in the foam will be difficult to rinse away. The formulated shampoo shows good result. This result indicate that no dirt was in the foam so prepared formulation is good.

Skin /eye irritation test

The eye and skin irritation tests 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.

Extractive values

Alcohol soluble

Water soluble

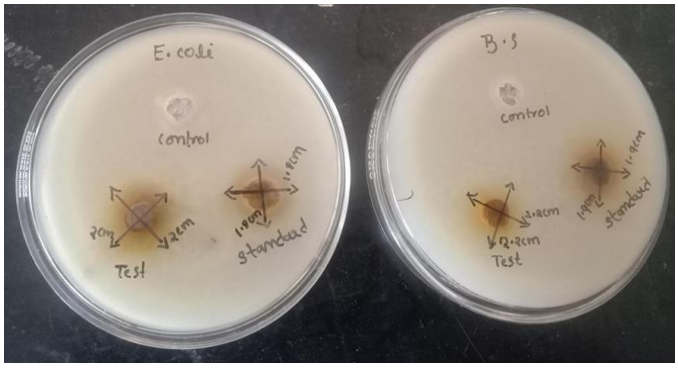
Table10: Physico Chemical Evaluation

S. No.	Physico chemical evaluation	Results
1	PH	5.11

2	Wash ability	Easily washable
3	Skin / eye irritation	No harmful effect on the skin
4	Extractive values: a)Alcohol soluble b)water soluble	115.08 113.60
5	Ash value: Total ash value Acid insoluble ash	18%
6	Dirt dispersion	Moderate
7	Moisture content determination	1.13%
8	Wetting Time	15sec
9	Solubility	Sparingly

Microbial activity

Formulated herbal shampoo powder has shown the anti bacterial activity by showing the zones of inhibition. In both E.coli and Bacillus subtilis. The standard and test have approximately same action.



Fungal activity

Formulated polyherbal shampoo powder which has not shown any fungal activity.

Formulated herbal shampoo powder has shown the anti bacterial activity by showing the zones of inhibition. In both E.coli and Bacillus subtilis. The standard and test have approximately same action

Fungal activity

Formulated polyherbal shampoo powder which has not shown any fungal activity

Commercial product- 1 Meera Shampoo Powder

Formulated poly herbal shampoo powder

Commercial product -2 Alps Shampoo Powder

Table11: Comparative Studies

Parameter	Formulated Poly Herbal Shampoo Powder	Commercial Product 1	Commercial Product 2
p^H	5.11	5.67	6.0
Extractive Values 1.Alcohol Soluble 2.Water Soluble	115.08 113.60	117.60 116.23	112.20 114.36
Ash Value Totalash Value Acid Insoluble Ash	18%	15%	12%
Moisture Content	1.13%	1.23%	1.54%
Wetting Time	15sec	13sec	17sec
Dirt Dispersion	Moderate	Good	Moderate
Solubility	Sparingly	Sparingly	Sparingly
Physico chemical			
Colour	Brown	Brown	Brownish green
Odour	Pleasant	Good	Pleasant
Texture	Smooth	Smooth	Smooth
General powder characterstics a. Angle of repose	28.65(Excellent)	31(good flow)	29.85(excellent)
b. Bulk density c. Tapped density	0.46g/ml 0.57g/ml	0.39g/ml 0.45g/ml	0.42g/ml 0.50g/ml
Washability	Easily washable	Easily washable	Washable

SUMMARY & CONCLUSION

The factors like UV radiations, use of harsh chemical products have direct and indirect impact on the hair. To overcome this problem the present study has undertaken to design a herbal hair products (Herbal hair oil, Herbal hair dye) which will give hair protection, conditioning effect, shine, manageability, moisturizes scalp but also reverses dry scalp and dry hair condition. It provides numerous essential nutrients required to maintain normal function of sebaceous glands and promotes natural hair growth. The evaluation parameters like sensitivity test, pH, irritation test, grittiness, saponification value, and acid value ofHerbal Hair Oil was evaluated. Organoleptic evaluation, general powder characteristics, physicochemical evaluation, phytochemical evaluation, rheological evaluation, patch test was carried out and was found to be within the standard range.

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