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Formulation and Evaluation of Poly Herbal Powder Shampoo from Cycleapeltata

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ABSTRACT

Shampoo is one of the daily use hair care cosmetics used for cleansing as it removes the dirt, debris, and sebum from the hair shaft and scalp. Shampooing is a common hair treatment used for variety of reasons among which dandruff is the most important one. Majority of ingredients in synthetic shampoos are chemicals and have a potential risk of side effects with its usage. For this reason, herbal shampoos are trending globally in the present scenario. Since, dandruff is an embarrassing chronic scalp disorder, it is essential to suppress it with safe shampoos. This invention discloses a formulation of powder shampoo with easily accessible raw materials with minimal side effects. The shampoo includes the powdered form of herbal ingredients such as Cycleapeltata (paada), mango leaves, guava leaves, brahmi, bhringaraj, black myrobalan, shikakai, reetha, having antidandruff as well as other hair benefits property. The poly herbal shampoo with combination of several hairs nourishing with minimal side effects is a promising, safe and effective antidandruff treatment method. Polyherbal shampoo powder of 2 different formulations was made and evaluated for physicalcharacteristics, general powder characteristics, PH, foam stability, dirt dispersion,irritancy and antimicrobial activity.

KEY WORDS: Poly herbal, Antidandruff, Cycleapeltata, Mango leaves, Guavaleaves, Brahmi, Bhringaraj, Black myrobalan, Shikakai, Reetha

I. INTRODUCTION

Shampoo can be describes as a cosmetic preparation, packed in a convenient form, used for cleansing hair and scalp to remove dirt, debris, residues of previously applied products and environmental pollutants[1].

PURPOSE OF SHAMPOOS

Cleansing the scalp and hair
Hair Nourishment
Hair Conditioning

TYPES OF SHAMPOO[2]

Liquid shampoo
Cream shampoo
Powder shampoo
Gel shampoo
Aerosol foam shampoo

HERBAL SHAMPOO

Herbal shampoos are shampoo preparations utilises traditional ayurvedic herbs that are meant for cleansing the hair and scalp. Herbal shampoos are infused with natural herbal ingredients and are free of harsh chemicals, thus yields better and long lasting results.

BENEFITS OF HERBAL SHAMPOO

Natural shine to hair
Stronger and more fortified hair
Nourishes hair naturally
Less hair fall
Irritation free scalp and skin
Improve hair quality

ADVANTAGES OF HERBAL SHAMPOO

Pure and organic
Less side effects
No chemical surfactants
No synthetic additives
No petroleum based ingredients

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Eco-friendly
Skin friendly
Budget friendly

HERBAL INGREDIENTS[3]

Herbs or herbal ingredients used in shampoo refers to whole plant or plant parts such as leaves, fruits, flowers, roots having properties that benefits hair. Numerous herbs are known for their hair nourishing, conditioning, cleansing properties and are widely used in herbal shampoos.

HERB PROFILE

PAADA

Synonym: Cycleapeltata, Indian moon seed

Paada is a twining shrub, climbing upon tall trees, found across India and Sri Lanka, in tropical forests and plains.

Family: Menispermaceae.

Leaves of paada are alternate,heart shaped, 3-7 cm length,2.5- 4 cm broad.

Paada is used in traditional medicine systems as wound healer, for skin and inflammatory disorders.

MANGO LEAVES

Synonym: Mangifera indica, mango

Mango leaves are foliage of evergreen tree native to Asia.

Family: Anacardiaceae

Mango leaves are simple, alternate, 12-30 cm long and 2-7 cm broad.

Mango leaves have antibacterial properties that help treat bacterial skin infections. Mango leaves are ancient technic to grow hair rapidly. The leaves contain nutrients that boost collagen production which is important for healthy hair and gives a shine to dull hair.

GUAVA LEAVES

Synonym: Psidiumgujava, guava bush

Guava is native to tropical America and is now grown in tropical and subtropical areas.

Family: Myrtaceae

Guava leaves are green, oval in shape,6-14 cm long, 3-4.5 cm broad and characterised by obtuse apex.

Guava leaves improve collagen activity aiding in hair growth and also have anti-bacterial and anti-inflammatory properties.

BHRAMI LEAVES

Synonym: somvalli, Indian pennywort

Bhrami is found in marshy or waterlogged areas of India.

Family: Scrophulariaceae

Bhrami leaves are small, bright green, oval, fleshy and is completely edible. Leaves are 0.4-0.6 cm thick and arranged oppositely to the stem.

Bhrami helps in boosting hair growth in areas with reduced hair growth and thus treats hair loss and baldness. It also helps reduce inflammation and dryness of scalp and imparts a cooling effect to the scalp.

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BHRINGARAJ LEAVES

Synonym: falsedaisy, keshraja, suryavarta, kesharanjana, markava, bhunga.
Bhringaraj is creeping herb native to india and southwest America.
Family: Asteraceae
Bhringaraj leaves are sessile, lanceolate, 2-10 cm long, 5-3 mm wide and oppositely arranged to the stem.
Bhringaraj promotes blood circulation to scalp, activates hair follicles and thus promotes hair growth. It treats and prevents hair baldness and also restores natural colour of hair.

BLACK MYROBALAN

Synonym: black himej, chebulicmyrobalan
Black myrobalan is deciduous tree native to south east Asia, south sri Lanka, Malaysia.
Family:combretaceae
Myrobalan fruits are yellow to orange brown and ovoid in shape.
Fruits of myrobalan are used as dye that darkens and softens the hair. It is useful for treating hairfall, itching and scalp infections like dandruff.

REETHA

Synonym: soap nut, wash nut, soap berry
Reetha is a deciduous tree native to western coastal areas of India, southern china and Japan.
Family: Sapindaceae
Reetha fruits are solitary round nuts, yellowish brown in colour. the fleshy portion contains saponins which act as natural surfactant.
Reetha act as natural shampoo due it its cleansing property. It also has antifungal properties that treat scalp disorders like dandruff.

SHIKAKAI

Synonym: soap pod, soap pod wattle
Shikakai is shrub like tree found in tropical woods and dry plains of India.
Family: Mimosaceae
Pod like fruits of shikakai contains saponins which act as natural cleanser. It a natural surfactant that helps clean the scalp, remove dandruff and impart shine to the hair.

LEMON

Synonym: citrus, citrus fruit

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Lemon is small evergreen tree native to south east asia, china and Myanmar and grow in Mediterranean climates.
Family: Rutaceae
Lemon is round, green to bright yellow coloured fruit with strong aroma.
Lemon contain vitamin c abundantly, which is a powerful antioxidant and also act as a natural preservative that improve shelf life of the product.

MATERIALS AND METHODOLOGY

I. COLLECTION OF HERBS

The plants selected for the formulation are collected from the locality, shade dried and powdered in a blender and sieved to obtain fine powder.

II. PREPARATION OF POLYHERBAL POWDER SHAMPOO [4]

♦ Weighing of powders:

The required herbal powders for the formulation of powder shampoo are weighed individually in a digital balance.

♦ Mixing of powders:

The accurately weighed, finely grounded herbal powders are mixed in ascending order of their quantities by continuous trituration until a fine homogenous mixture is obtained.

♦ Storage:

The mixture of herbal powder obtained is collected and stored in airtight containers.

III. FORMULATIONS OF POLYHERBAL POWDER SHAMPOO

Two batches of poly herbal powder shampoo (PS1 and PS2) were prepared and used for further evaluation. Table depicts the Formulations prepared in different quantities

INGREDIENTS	PS1	PS2
Paada leaves	15 g	20 g
Mango leaves	10 g	10 g
Guava leaves	15 g	10 g
Bhrami	10 g	10 g
bhringaraj	10 g	10 g
Black myrobalan	8 g	8 g
Reetha	10 g	15 g
Shikakai	20 g	15 g
Lemon powder	2 g	2 g

Table: 01

IV.EVALUATION OF POLYHERBAL POWDER SHAMPOO

■ ORGANOLEPTIC EVALUATION [5]

The prepared formulations are subjected to evaluating parameters like colour, odour, texture.

■ GENERAL POWDER CHARACTERISTICS

General powder characteristics involves evaluation of parameters which affect properties of powder like appearance, flow properties etc.

a] PARTICLE SIZE [6]:

Particle size determination of poly herbal powder shampoo is done by using sieving method. Powder sample are added to the top of nest of sieves arranged in decreasing order of size from top to bottom. As the sieves vibrate, the powder sample gets sorted out onto the different sized sieves. The weight of sample retained on each sieve is then used to determine the particle size distribution.

b] ANGLE OF REPOSE [7]:

Angle of repose determines flow property of a powder and is done by funnel method. A funnel is placed 2 cm over a graph sheet. Particles are allowed to flow gently through the funnel until a heap is formed which has reached the funnel orifice. The height and radius of the heap/pile formed were measured using a ruler. The angle of repose was thus estimated by the formula,

$$\text{Angle of repose, } \theta = \tan^{-1}\frac{h}{r}$$

Where,
h = height of the pile formed.
r = the radius of the base of pile

c] BULK DENSITY [8]:

The bulk density of a powder is the ratio of the mass of powder sample to its volume. Into a 100 ml graduated cylinder, introduce approximately 10 g of the powder sample weighed accurately. Carefully level the powder devoid of compacting. Calculate the bulk density in g per ml by the formula

$$\text{Bulk density} = \frac{\text{weig ht of the sample}}{\text{bulk volume}}$$

d] TAPPED DENSITY:

The tapped density is determined by mechanically tapping a graduated measuring cylinder containing the powder sample. Pass a weighed quantity of sample to 100 ml measuring cylinder. Tap the cylinder 500 times and record the volume.

$$\text{Tapped density} = \frac{\text{Tapped volume}}{\text{Bulk volume}}$$

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e] HAUSNER RATIO[9]:

Hausner ratio is an indirect bulk property of a powder and is also a measure of interaction between the particles.

$$\text{Hausner ratio} = \frac{\text{Bulk density}}{\text{Tapped density}}$$

F] CARR'S COMPRESSIBILITYINDEX[9]:

Carr's compressibility index is used to predict the aptness of a powder. Carr's index of a powder is calculated by the formula,

$$\text{Carr's index} = \frac{\text{Tapped density} - \text{Bulk density}}{\text{Tapped density}} \times 10$$

■ PHYSICO CHEMICAL EVALUATION:

● FOAMABILTY [10]:

2 g of shampoo powder was taken in a 250 ml graduated cylinder and 50 ml of water was added and shaken. The total height of foam after 1 minute of shaking was recorded at different time intervals like 0, 10, 20, 30 minutes respectively.

● DETERMINATION OF PH[11]:

1g of herbal powder shampoo was taken and 9ml of distilled water was added to it. PH of the resulting solution was measured using pH meter.

● Moisture Content Determination[12]:

10 g of herbal powder shampoo prepared was weighed in a tare evaporating dish and kept in hot air oven at 105℃. Drying is repeated until a constant weight is observed. The moisture content of each formulation of powder shampoo was calculated.

● LOSS ON DRYING [13]:

2 g of the herbal shampoo powder is 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 to find out the weight loss on drying.

● WASHABILITY [14,15]:

The herbal shampoo powder was applied onto the skin. The ease and extent of washing with water is checked manually.

● SOLUBILITY [16]:

1 gram of the powder is weighed accurately and transferred into a beaker containing 100 ml of water and shaken well, warmed to increase the solubility, cooled and then filtered, the residue obtained is weighed and recorded.

● IRRITANCY TEST [17]:

Dab a small amount of the prepared powder on the pulse of your wrist or crook of your elbow. Leave the preparation for 15-20 minutes unwashed. Watch for signs of allergic reactions like redness, rashes or itchiness etc.

● DIRT DISPERSION [18]:

Two drops of 1% herbal shampoo powder was added in a test tube containing 10 ml ofdistilled water. 1 drop of India ink was added and the test tube was stoppered and shaken. The amount of ink in the foam was concluded as none, light, moderate, or heavy.

● ANTI MICROBIAL ACTIVITY [19,20]:

The antimicrobial activity test of prepared formulations is done by cup-plate method using the agar medium. A suspension of microorganisms was uniformly swabbed on agar plates using sterile cotton swabs. Formulations of prepared shampoo were addedto the agar wells. The petri plates were sealedand incubated at 37° C for 24 hours. The zoneof inhibition around the well was measured and recorded.

II. RESULTS AND DISCUSSION

POWDER SHAMPOO

Powder shampoo is same as liquid shampoo, just in powder form. It contains herbal ingredients thathelp promote hair growth, reduce dandruff, and prevent hair loss. Powder shampoo helps to absorbthe excess oils andreduce greasiness. This product is free from harmful chemicals.

●ORGANOLEPTIC EVALUATION

The prepared powder formulations [PS 1 and PS2] was evaluated for physical parameters like colour, odour, texture and results are depicted in the table below

SL.NO	Evaluation parameter	PS1	PS2
1	Colour	green	green
2	Odour	characteristic	characteristic
3	Texture	Fine	Fine

Table: 02

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● GENERAL POWDER CHARACTERISTICS

The prepared powder shampoo formulations are evaluated for general powder properties and results are given in the table 03

Sl.no	Characteristics	PS1	PS2
1	Particle Size	8-10 µm	8.-10 µm
2	Angle Of Repose	38.4°	38.3°
3	Bulk Density	0.525 g/cc	0.502 g/cc
4	Tapped Density	0.57 g/cc	0.57 g/cc
5	Hausner's Ratio	1.46	1.27
6	Compressability	12.23	6.68

Table:03

● PHYSICO CHEMICAL EVALUATION

FOAMING INDEX:

Powder shampoo formulations PS1 & PS2 produced foam. The foam stability of herbal shampoo listed in table 04

PH DETERMINATION:

PH of the powder shampoo PS1 &PS2 are estimated and results are depicted in table 04

MOISTURE CONTENT DETERMINATION:

Moisture content of the powder shampoo formulationwas determined and results are shown in table 04

LOSS ON DRYING:

Loss on drying for the powder shampoo formulations was performed and results are shown in table 04

WASHABILITY:

The prepared powder shampoo formulations were applied to the skin and extent of easiness to wash with water was check manually and the results are shown in table 04

IRRITANCY TEST:

Irritancy test for the formulations was performed and the results are shown in table 04

DIRT DISPERSION:

Dirt dispersion test for the powder shampoo formulation was performed and the results are shown in table 04

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ANTIMICROBIAL STUDY:

The microbiology tests were used to identified and results are shown in table 04

Sl. No	Test	PS1	PS2
1	Foaming Index	Good foam	Small amountoffoam
2	PH	Slightly Acidic	Slightly Acidic
3	Irritation test	No irritation	No irritation
4	Washability	Excellent	Good
5	Dirt dispersion	The estimated amount of ink in the foam is light	The estimated amount of ink in the foam is moderate
6	Loss on drying	Within limit	Within limit
7	Moisture content	1.86%	1.78%
8	AntimicrobialActivity	Strong activity	Moderate activity

Table:04

III. CONCLUSION

Current study is to successfully prepare a poly herbal shampoo containing herbal ingredients which are traditionally used for their hair cleansing actions.All the ingredients used to formulate shampoo are safer than the synthetic ingredients. All the herbal ingredients are mixed with shikakai and reetha which act as natural surfactant that cleanses and soothe the scalp. The citrus powder added to the formulation acts as preservative and also has antioxidant properties. The formulated herbal powder is evaluated for foamability and antimicrobial activity. Based on evaluation results, formulation 1[PS 1] showed better results than formulation 2 [PS 2].

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