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Research Article

FORMULATION, DEVELOPMENT AND EVALUATION OF HERBAL POWDER SHAMPOO

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Abstract:

The main objective of these research study was to formulate herbal powder shampoo using natural ingredients. "Multani Mitti" or Fuller's earth is a popular substance as a home remedy. It has been traditionally used as a cleanser for skin & hair in world centuries.

The major function of shampoo is to clean hair, removals of oils, dirt's, scalp debris and accumulated sebum. Synthetic preservatives and detergents have been linked to negative customer impact in the past. Incorporating natural extracts with functionality comparable to synthetic chemicals is a more extreme way to decreasing synthetic compounds. Our herbal powder shampoo is made up of Multani mitti, Fenugreek, Amla, Banana extract, Hibiscus, Jasmin, Green tea, Reetha, and Curry leaves, all effective in hair care. Banana is popularly used in skin cosmetics but here, in our formulation we used banana extract as a moisturizing, conditioning agent because of banana containing several elements which are beneficial for hair and scalp health. The combination of many herbal-derived ingredients has resulted in a highly effective dry powder shampoo. This formulation was done at a laboratory scale and evaluated number of parameters such as Bulk density, Tap density, Porosity, Ash value, Solubility, pH, Foaming index.

Key words: *Multani mitti, Banana extract, Herbal powder shampoo.*

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INTRODUCTION:

In ancient times products from natural sources have been used for human health. Herbal substances widely used, because of herbal having less side effect. Multani mitti (Fuller's earth) comes across as a skin care product for many of us but it has also been used for centuries to cleanse the hair. Multani mitti which helps to remove the impurities in the

form of dead skin cells. It helps to make the skin radiant. It has been proven best for the irritation-prone skin. Its soothing action calms the skin, cures the inflammation. It is perfect for oily skin. It removes the dirt and excess of oil by acting as an adsorbent. It provides fresh, radiant and glowing skin.^{1,2} Using multani mitti hair shampoo can be a good idea to improve your hair look. Also, care for

your hair with this ingredient can absorb excess oil, remove impurities from the scalp, and boost hair growth.³

The raw drug materials used in this investigation came from a nearby neighborhood. All of the items

were rinsed, dried in the shade, and finely pulverized for later use. For the manufacture of this poly herbal powder shampoo formulation, the following substances were employed.⁴

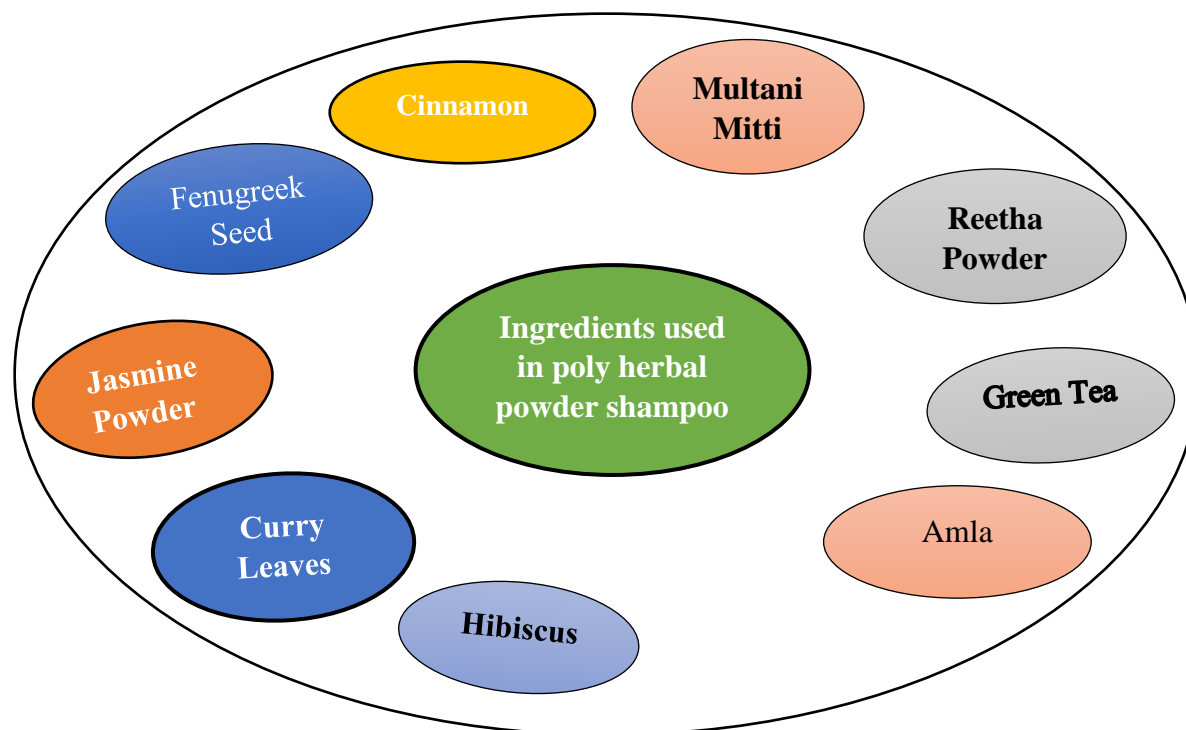


Fig.1. Ingredients used in poly herbal powder shampoo

Multani Mitti OR Fuller's Earth:

Multani mitti, which aids in the removal of impurities such as dead skin cells. It has been shown to be the most effective for hair that is prone to split ends, dandruff. Its calming effect comfort the scalp and reduces irritation produced by an increase in phlogistic agents.⁴ It gives smoothening, straighten hair, promote hair growth and shining hair.⁵ Fuller's earth, also known as 'Multani Mitti' in India, was utilize as a fingerprint powder in this study to generate potential fingerprints and was compared to other powders.⁶



Fig.2. Multani mitti

Banana Extract:

Banana is an excellent source of nourishment and a well-balanced diet to people of all ages about the world and contributes to income of individuals through crop production, processing and marketing. Banana is eaten in many ways and has plenty of nutritional and medicinal benefits (Table 1). Bananas and plantains are grown in India from Vedic times and mentioned in Tamil literature dating back to 120 BC.^{7, 8}



Fig.3. Banana extract

Reetha:

Sapindus mukorossi (fam: Sapindaceae), well known as soapnuts, are used medicinally as an expectorant, emetic, contraceptive, and for treatment of excessive salivation, epilepsy, chlorosis, and migranes. *Sapindus mukorossi* is a popular ingredient in Ayurvedic shampoos and cleansers. They are used in Ayurvedic medicine for treatment of eczema, psoriasis, and for removing freckles. Soapnuts have gentle insecticidal properties and are traditionally used for removing lice from the scalp.⁹

**Fig .4. Reetha****Green Tea:**

The synonym of the green tea plant is *Camellia thea*. The biological source of the plant is contains the prepared leaves and leaf buds of *Camellia sinensis* or *Thea sinensis*. The chemical composition of green tea varies with genetic strain, climatic conditions, soil properties, plucking season, position of the leaf, processing and storage.¹⁰

**Fig.5. Green Tea****Amla:**

The amalaki tree, also known as the Indian gooseberry or emblic myrobalan, produces the amla fruit. Vitamin C, minerals, and antioxidants are rich in amla fruit. Ayurvedic medicine practitioners claim that the fruit is beneficial for hair health and hair growth.¹¹

Indian traditional systems of medicine (like Ayurveda, Unani, siddha), mostly used one amongst them is Indian gooseberry or Amla, also known as *Phyllanthus emblica* Linn. (Syn. *Embolica officinalis* Gaertn.) belongs to the family Euphorbiaceae.¹²

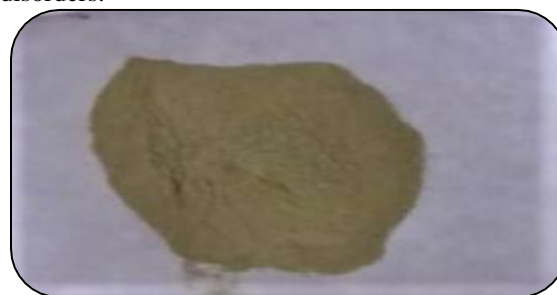
**Fig. 6. Amla****Hibiscus :**

Herbal healers recommend Chinese hibiscus (*Hibiscus Rosa-sinensis*) as a hair-growth cure.

Hibiscus can help to prevent hair loss, make your hair seem healthy and shiny, thicken and add volume, treat dandruff, condition against frizz, dryness, and breakage, and prevent split ends.¹³

**Fig. 7. Hibiscus****Curry leaves:**

Murraya koenigii is widely used in Indian cookery from centuries and have a multipurpose role to play in traditional medicine. The plant is credited with tonic and stomachic properties. Bark and roots are used as stimulant and externally to cure eruptions and bites of poisonous animals. Green leaves are eaten raw for cure of dysentery, diarrhoea and vomiting. Leaves and roots are also used traditionally as bitter, anthelmintic, analgesic, curing piles, inflammation, itching and are useful in leucoderma and blood disorders.¹⁴

**Fig.8 Curry leaves**

Fenugreek:

Fenugreek acts physiologically by stimulating blood circulation to the hair follicles and steroid saponins are supposed to interact with DHT (dihydrotestosterone) metabolism. One reason for male and female pattern hair loss is thought to be due to the effects of DHT on genetically predisposed hair follicles.¹⁵



Fig.9. Fenugreek

Jasmine: In India, Jasmine (*Jasminum sambac*, *sans-mallika*) is widely used in manufacturing high grade aromatherapy, cheaper synthetic oil obtained by blending a few constituents are used incenses room fresheners and soaps etc.¹⁶

MATERIALS AND METHODS:**Formulation Table:****Table No.1**

Sr.No.	Ingredients	Quantity Taken			Uses
		F1	F2	F3	
1.	Multani Mitti	4gm	4.5gm	3.8gm	Active Pharmaceutical Ingredient
2.	Reetha Powder	2gm	1.8gm	2gm	Foaming Agent
3.	Amla	1gm	1.5gm	1.7gm	Antioxidant
4.	Green Tea	0.6gm	0.4gm	0.4gm	Antimicrobial Agent
5.	Banana	0.6gm	0.36gm	0.4gm	Conditioning Agent
6.	Hibiscus	0.6gm	0.36gm	0.4gm	Shining Agent
7.	Curry Leaves	0.6gm	0.36gm	0.4gm	Hair Growth
8.	Jasmine Powder	0.1gm	0.36gm	0.45gm	Flavoring Agent
9.	Fenugreek Seed	0.5gm	0.36gm	0.45gm	Anti-dandruff Agent

Procedure for Formulation of Herbal Powder Shampoo:

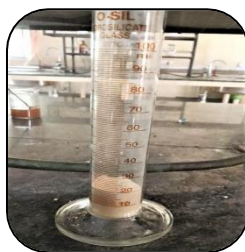
- Drying:** All the ingredients which was used for herbal powder shampoo was dried under the shade drying. Ingredients which was dried which further grinded by using mortar pestle.
- Weighing:** All the required herbal powder for shampoo preparation were weighed individually.
- Size Reduction:** The crude ingredient were collected and these ingredient's size reduced using hand driven mixer grinder individually.
- Mixing:** All these fine ingredients were mixed thoroughly by mixer to form a homogeneous fine powder.
- Sieving:** Then this fine powder was passed through sieve No.80 to get the sufficient quantity to the fine powder.
- Evaluation:** Prepared formulation was evaluated by using several evaluation parameters.
- Packaging:** Final formulation which was passing all evaluation test was packed in suitable container.

EVALUATION PARAMETER**1) Morphological Parameter**

- a) Color
- b) Odor

2) Physicochemical Parameters

- 1) Bulk Density
- 2) Tapped Density
- 3) Angle of Repose
- 4) Porosity
- 5) Solubility
- 6) pH
- 7) Ash value
- 8) Foaming Index

Physicochemical Parameter**1. Bulk Density****Fig.10. Bulk density**

The ratio of the mass of an untapped powder sample to its volume, including the contribution of the inter-particulate void volume, is the bulk density of a powder. As a result, both the density of powder particles and the spatial arrangement of particles in the powder bed affect density.^{17, 18}

Formula: $\rho_b = m / v$

Table No.2.

Sr.No.	Parameters	Observations		
		F1	F2	F3
1	Bulk Density	0.71gm/ml	0.69gm/ml	0.71.5gm/ml

2.Tapped Density**Fig.11. Tapped density**

The ratio of a powder's mass to the volume occupied by the powder after it has been tapped for a specified period of time is known as tapped density. The random dense packing of a powder is represented by its tapped density.^{17,18}

Formula: $\rho_t = m / v_t$

Table No.3.

Sr.No.	Parameter	Observation		
		F1	F2	F3
1	Tapped Density	0.36gm/ml	0.38gm/ml	0.36.5gm/ml

3. Angle of Repose:

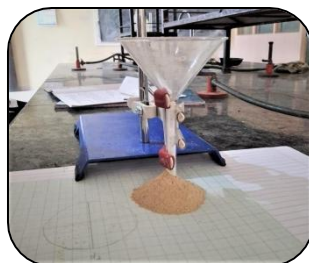


Fig. 12. Angle of repose

Angle of Repose is the angle formed by the slope of a powder pile and the horizontal plane in a static balancing. When the powders fall to the ground and form a cone, it is measured. It indicates the particles' flow ability.^{17,18}

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

Table No.4.

Sr. No.	Parameter	Observation		
		F1	F2	F3
1	Angle of repose	33.22	31.23	34.5

4. Porosity:

Porosity, or the amount of vacant space in a substance, is an important physical attribute of particles. Porosity can help predict deformation qualities during compression, shelf life, moisture penetration, and bio availability in the pharmaceutical industry.^{17,18}

Formula: $\frac{\text{Bulk density} - \text{True density}}{\text{Bulk density}}$

Table No.5.

Sr.No	Parameter	Observation		
		F1	F2	F3
1.	Porosity	49%	49.7%	48.3%

5. Solubility:

A solute's solubility refers to its ability to dissolve in a pure solvent. At specific environmental circumstances, this is the maximum amount of solute that the pure solvent can hold in solution. A solute cannot dissolve further in the amount of solvent provided beyond this saturation concentration.^{17, 18}

Sr.No.	Parameters	Observation		
		F1	F2	F3
1	Water Soluble	Insoluble	Insoluble	Insoluble
2	Alcohol Soluble	Soluble	Soluble	Soluble

Table No.6.

6. pH:

A pH meter is an electronic device used for measuring the pH of a liquid. A typical pH meter consists of a special measuring probe connected to an electronic meter that measures and displays the pH reading. 1 g each of herbal shampoo powder formulations was taken and dissolved in 10 ml of water. Their pH was checked with the help of pH meter.¹⁹

7. Ash Value:**Fig.13. Ash value**

Ash values, especially in powder form, are useful in establishing the quality and purity of crude pharmaceuticals. The goal of ashing vegetable medications is to get rid of any organic debris that might interfere with an analytical assessment.^{19, 20}

Formula:
$$\frac{\text{Weight of ash}}{\text{Weight of drug}} \times 100$$

Table No.7.

Sr.No	Parameter	Observation		
		F1	F2	F3
1.	Ash Value	24	26.3	23.7

8. Washability Test: Our three batches (F1, F2 and F3) easily washable.

9. Foaming Index:

The foaming ability of an aqueous decoction of plant material & their extracts are measured in terms of foaming index. The Foam Index Test is a laboratory titration process that analyses how much AEA (air entraining agent) is absorbed by fly ash or fly ash and cement mixtures. An AEA is added to a fly ash and cement suspension, which is then shaken.^{21, 22}

RESULTS AND DISCUSSION:**1. Morphological Parameters:****Table No.8**

Sr. No.	Parameters	Observation
1	Colour	Pale Yellow
2	Odour	Pungent

2. pH**Table No.9.**

Sr.No.	Parameter	Observation		
		F1	F2	F3
1	pH	7	7	7

3. Foaming index

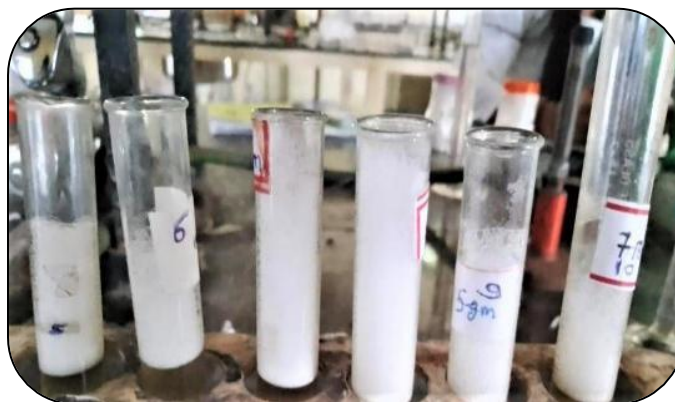


Fig.14. Foaming index

Table No.10

Sr.No.	Parameter	Observation		
		F1	F2	F3
1	Foaming Index	166.6	160.3	165.5

Three formulations F1, F2 and F3 of herbal shampoo powder were prepared using Multani mitti, Fenugreek, Amla, Banana extract, Hibiscus, Jasmin, Green tea, Reetha, and Curry leave in different composition (Table-1) of crude drugs. Multani mitti and reetha are the main API used in this formulation. These formulations were prepared using mixing in ascending order by weight and with continuous trituration. Preparation (F1, F2 and F3) were evaluation organoleptically observing colour, odour, and texture. Results shows pale yellow, pH is 7 that is neutral. Our three batches (F1, F2 and F3) easily washable. Out of three batches F1 is suitable for use.

CONCLUSION:

Herbal shampoo formulated by using various medicinal plants, because they having less side effect and economical. It contains Multani mitti, Reetha, Amla, Green tea, Hibiscus, Banana, Jasmine powder, Fenugreek and Curry leaves. herbal powder shampoo helpful for removing the dirt, dandruff, dead skin on scalp, split ends of hairs also strengthen, smoothen and shining the hair. It is a very good combination of herbal powder shampoo containing naturally available ingredients like Multani mitti, Reetha, Amla, Green tea, Hibiscus, Banana, Jasmine powder, Fenugreek and Curry leaves. Out of three batches F1 batch was shown best evaluation parameters as compare to other two batches.

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