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Research Article

Formulation And Evaluation of Herbal Powder Shampoo

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ABSTRACT

The area beneath your skin is called the hair follicle, and the area visible above it is called the hair shaft. 95% of hair is made of keratin. Ectoderm from the skin gives rise to vital body parts like hair, nails, and the sebaceous and sweat glands. Hair also serves as a protective covering for the body. Neem contains fatty acids like oleic and stearic acid. Neem also consists glycerides of saturated and unsaturated fatty acids. The anti-fungal properties of Tulsi help to treat dandruff. The effective use of tulsi to hair can relieve the itchiness, inflammation and irritation. The regenerative properties of tulsi help in reducing hair fall. Shikakai, Hibiscus and Brahmi makes hair soft and shiny, prevents itchy scalp, Eliminates lice, Boosts hair growth.

INTRODUCTION

Despite its seemingly simple appearance, a hair strand is one of the body's most intricate structures. Hair consists of two distinct structural components. The area beneath your skin is called the hair follicle, and the area visible above it is called the hair shaft. 95% of hair is made of keratin. Ectoderm from the skin gives rise to vital body parts like hair, nails, and the sebaceous and sweat glands. Hair also serves as a protective covering for the body. Because they are derived from the epidermis during embryological development, they are also known as epidermal derivatives. Your hair grows and is held in place in the hair follicle. At the bottom of the follicle, a piece of tissue called the papilla contains tiny blood vessels. [1]

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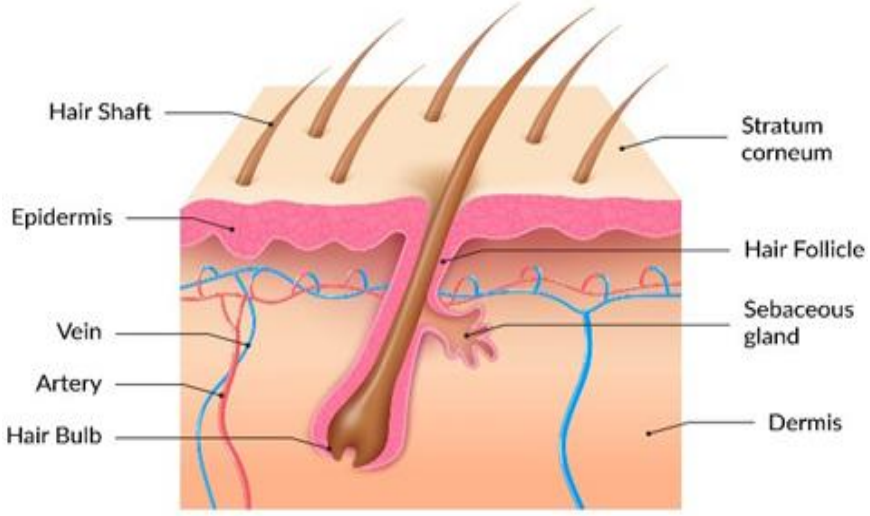


Fig No. 1 Structure of Hair

Hair Shaft: The hair shaft is the part of the hair that we can see. The shaft is the visible part of the hair that sticks out of the skin. The hair root is in the skin and extends down to the deeper layers of the skin. Each hair shaft is made up of two or three layers: the cuticle, the cortex, and sometimes the medulla. [2]

The layer of hair shaft:

1. **The Inner Layer:** This is called the medulla. Depending on the type of hair, the medulla isn't always present.

2. **The Middle Layer:** This is called the cortex, which makes up most of the hair shaft. The medulla and the cortex contain pigmenting cells responsible for giving hair color.

3. **The Outer Layer:** This is called the cuticle, which is formed by tightly packed scales in an overlapping structure that resembles roof shingles. Many hair conditioning products are formulated to clean the cuticle by smoothing its structure. [3]

Hair growth cycle consists of four phases:

1. **Anagen (growth phase):** It is the growing phase. The anagen phase is when your hair grows your hair follicle forms a new hair shaft.

2. **Catagen (transitional phase):** During this phase the hair follicle shrinks and hair growth slows. ·

3. **Telogen (resting phase):** It is the resting phase where hair growth stops and new hair begins the growth phase, pushing the old hair out.

Exogen phase (last phase): It is hair growth cycle where hair strand completely detaches from the scalp and sheds off. [4]

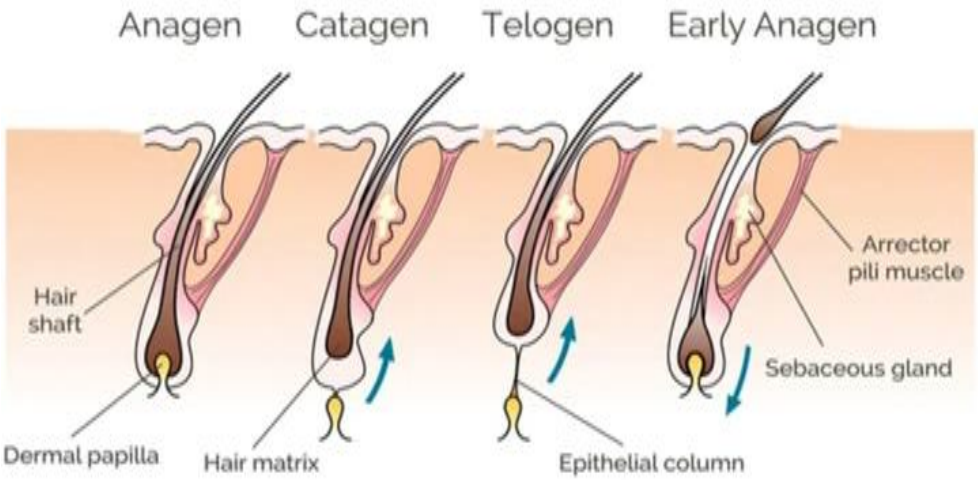


Fig. No. 02 Growth cycle of hairs

Problems occurring during hair care-

Dandruff: is a non-inflammatory harmless skin condition that affects scalp and might result in hair loss. It is scaly and adheres to the root of the hair.

Hair Loss: The main reason behind the hair loss is stress, medication, changes in hormone and many hair styling products can contribute to hair loss.

Oily Hair/Greasy Hair: Oily hair is caused by excessive production of natural oil by the scalp sebum is produced by sebaceous glands which sometimes "work overtime" leading to excessive amount of oil.

Dry Hair: Dry hair occurs due to deficiency of proteins in the diet, menopause, anaemia, hormonal imbalance, birth control pill can also lead to dry hair.

Split Ends: Splits Pend occurs when the hair ends dry and other reasons are exposure to extreme weather conditions. Hair care techniques such as straightening and curling and chemical hair products may cause spilt ends. [5]

Shampoo:

Shampoos are the cosmetics preparation meant for cleaning the hair by removal of the dirt grease from the hair shaft and scalp. The purpose of using shampoo is to remove dirt that is build up on the hair without out much of the sebum. [6]

Benefits Of Herbal Shampoo:

1. More shine
2. Less hair loss
3. Long lasting color
4. All natural, no chemicals
5. Stronger and more fortified hairs
6. Won't irritate skin or scalp
7. Keep healthy natural oils [7]

Types Of Shampoos:

1. Powder shampoo
2. Lotion shampoo
3. Clear liquid shampoo
4. Solid gel shampoo
5. Medicated shampoo
6. Liquid herbal shampoo [8]

Function Of Herbal Shampoo:

1. Lubrication
2. Conditioning
3. Hair growth

4. Maintenance of hair color
5. Medication [9]

Formulation content of herbal shampoo:

1. **Foam stabilizers:** Softeners, or both Customers value foam. It is psychologically associated with the detergent effect, but it is also an indication that the cleaning job has been completed. The upstart of foam its volume, softness, texture, stability and removal by rinsing are all components of foaming qualities. These properties are primarily enhanced by addition of fatty acid alkanol amides, which impart a creamy feel as well as softer and more stable foam.

2. **Thickeners:** Consistency and richness are provided by natural gums (Karaya, tragacanth), cellulose hydrocolloids, acrylic polymers (carbomer) or salt such sodium.

3. **Conditioners:** They are intended to bring softness and gloss to reduce flyaway and to enhance detangling. Their role in a shampoo is not effective as conditioner because of multiple function. They are useful in shampoo for dry and damage hair. A great number of compounds are added according to type of formulation, the purpose, care and beautifying aims they are mostly fatty ingredients, protein and cationic polymers.

4. **Preservatives:** Help in increasing shelf life of herbal product.

5. **Fragrances and Colorants:** Fragrance and colorants are intended to individualize shampoo perception. [10,11]

Herbs Used in The Herbal Shampoo: -

1. Neem-

Biological source: It is the dried or fresh Leaves of Azadirachta indica Linn. Belonging family Meliaceae.

Chemical constituents- Neem contains fatty acids like oleic and stearic acid. Neem also consists glycerides of saturated and unsaturated fatty acids.

Reasons- The anti-fungal properties of neem help to treat dandruff. The effective use of Neem to hair can relieve the itchiness, inflammation and irritation. The regenerative properties of Neem help in reducing hair fall. Neem consists of fatty acids; it helps the scalp to nourish and keeping the hair smooth. [12]

2. Tulsi:

Biological Source: Dried and fresh leaves of Ocimum tenuiflorum Linn belonging to family Lamiaceae.

Chemical constituents: Tulsi contain linalol, eugenol, ocimem, estragol, thymol.

Reason- The anti-fungal properties of Tulsi help to treat dandruff. The effective use of tulsi to hair can relieve the itchiness, inflammation and irritation. The regenerative properties of tulsi help in reducing hair fall. [13]

3. Shikakai-

Biological source: It is the fruits of Acacia concinna Belonging family Fabacae.

Reasons- makes hair soft and shiny, prevents itchy scalp, Eliminates lice, Boosts hair growth. [14]

4. Hibiscus-

Biological source: It is the flowers of Rosa sinensis Belonging family Malvaceae.

Reasons- makes hair soft and shiny, Prevents hair loss, Boosts hair growth. [15]

5. Brahmi-

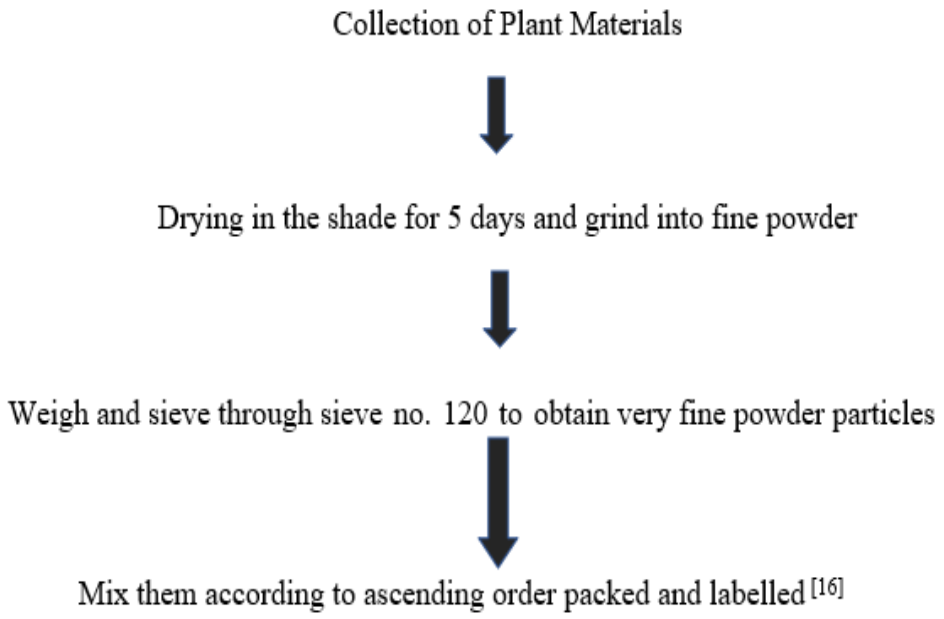
Biological source: It is the leaves of Brahmis bacopa monnieri Belonging family Plantaginaceae.

Reasons- Antidandruff, makes hair soft and shiny, Prevents hair loss, Boosts hair growth. [16]

MATERIALS AND METHOD-

Materials- Neem, Tulsi, Shikakai, Hibiscus, Brahmi, Aloe vera powder, Liquorice, etc.

Methods-



Formulation Table- (50gm)

Table no. 1 Formulation table

Sr. No.	Ingredients	Quantity(gm)
1	Neem leaves	5gm
2	Shikakai	10gm
3	Hibiscus	1.5gm
4	Amla	3.3gm
5	Aloe- vera	10gm
6	Bhringraj	5gm
7	Liquorice	1.7 gm

Evaluation Parameters:

1. Organoleptic evaluation:

Organoleptic evaluation on the parameters like color, odor taste, and texture was carried out. Color and texture were evaluated by vision and touch sensation respectively. [17]

2. General powder characteristics:

General powder characteristics include 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. Samples for all these

evaluations were taken at three different levels i.e. from top, middle and lower level

A. Particle size:

Particle size is a parameter, which affect various properties like spread ability, grittiness etc., particle size was determined by sieving method by using I.P. Standard sieves by mechanical shaking for 10 min.

B. Angle of repose:

It is defined as the maximum angle possible in between the surface of pile of powder to the horizontal flow.

C. Funnel method:

Required quality of dried powder is taken in a funnel placed at a height of 6cm 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 were noted and recorded the angle of repose (θ) can be calculated by using the formula.

D. Bulk density:

Bulk Density is the ratio between the given mass of a powder and its bulk volume. The 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 hardwood 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. [18,19]

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

E. 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.

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

3. Physicochemical evaluation:

A. pH:

The pH of 10% shampoo solution in distilled water was determined at room temperature 25°C. The pH was measured by using pH paper.

B. Washability:

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

C. 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. [20]

D. 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.

E. Moisture content:

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

F. 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.

G. 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 the standard volumetric flask. This extract is taken in 10 test tubes in a series of the successive portion of 1, 2, 3….10 ml and the remaining volume is made up of 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.

H. Skin/eye irritation test:

The skin/eye irritation tests revealed that the herbal shampoo powder shows no harmful effect on the skin and eye. This is due to the absence of synthetic surfactants. Most 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 the skin and eye. [21]

RESULTS AND DISCUSSION-

Sr. No.	Evaluation Test	Results
1.	**Organoleptic evaluation** a) Color b) Odor c) Taste d) Texture	Moss green Characteristic Bitter Smooth and fine powder
2.	**General Powder Characteristics** a) Particle Size b) Angle Of Repose c) Bulk Density d) Tap Density	0.177mm 31° 1.2g/cm^3 2.5g/cm^3
3.	**Physicochemical Characteristics** a) pH b) Solubility c) Washability d) Dirt Dispersion	6 Soluble in water with moderate heating Easily washable with water Moderate 9.01gm remain out of 10gm 60sec Good foaming

	e) Moisture Content f) Wetting Time g) Foaming Index h) Skin/Eye Irritation Test i) Stability	No harmful effect on skin Stable at room temperature

CONCLUSION-

The purpose of this study was to create a shampoo that is entirely herbal and comparable to the synthetic shampoos that are sold today. We created an herbal shampoo by utilizing plant extracts, which are widely used in traditional Asian medicine and highly regarded for their ability to cleanse hair. All the components that go into making shampoo are safer than synthetic conditioning agents like silicones and polyquaterniums, and they can also significantly lessen the loss of hair or protein during mixing. To achieve the conditioning effect, we have used plant extracts such as Shikakai and Amla in place of cationic conditioners. Several experiments were conducted to assess and contrast the physicochemical characteristics of shampoos that were prepared and marketed

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