



FORMULATION AND EVALUATION OF POLYHERBAL SHAMPOO

¹Barve Apurva Babasaheb, ²Donagre Rutika Vilas, ³Thange Apurva Bhanudas, ⁴Gulve Pradnya Sudam

¹ UG Scholar, ²UG Scholar, ³UG Scholar, ⁴ UG Scholar
Pharmacy Department

Matoshri Miratai Aher Collage of Pharmacy Karjule Harya, Ahmadnagar, India

ABSTRACT - The purpose of study is the formulate and evaluate of polyherbal shampoo from the various herbal ingredients. Now days the hair disorders like dandruff problems are most common. That problem cannot be removed entirely but can be handled and regulated effectively. The main objective of the study is to avoid the synthetic ingredient whose functionally comparable with their natural ingredients. Several herbs are reported to be affecting in controlling such problems. Most effective herbs were chosen and used in different combination for preparation of shampoo in order to improve antidandruff activity & health of hairs. This herbal shampoo was formulated using natural ingredients like, *lawsonia inermis* (Henna), *Phyllanthusemblica* (Amla), *Azadirahaindica* (Neem), *Aloe barbadensis* (Aloevera), *Fenugreek* (Methi), *Sapindus mukorossi* (Reetha), *Ocimumsactum*(Tulsi), *Acacia Concinna* (Shikakai), *Citrus limon* (Lemon), Rose Water, Water. The formulation at laboratory scale was done and evaluated for number of parameters to ensure its safety and efficacy.

KEYWORDS - Hairfall, Dandruff, Polyherbal, Evaluation, Neem.

INTRODUCTION

From ancient time beyond memory, the human has been using the nature care for their health, skin and hair. The natural ingredients have preventive actions. While relationship between dandruff and seborrhea dermatitis has at times been a matter of discussion. Many regard seborrhea dermatitis of the scalp as severe dandruff; others think dandruff should be used to describe any flaking of the scalp. Dandruff is nothing but a clinical condition caused by *Malassezia (pityrosporum)* species. It is known that fungistatic ingredients in antidandruff shampoos control dandruff. Currently available treatment of dandruff includes therapeutic use of zinc pyrithione, salicylic acid, imidazole derivatives, glycolic acid, steroids and coal tar derivatives. But these ingredients have poor clinical efficacy. Also these drugs are unable to prevent recurrence of dandruff. The herbal shampoo was formulated using herbal ingredients such as. Both have antidandruff action. The synthetic shampoos in market cause eye irritation and are toxic in nature. The surfactants used in synthetic shampoos leave salt deposits of sodium, calcium and magnesium on the hair shaft causing dryness of hairs. Dandruff, the excessive shedding of dead skin cell from scalp, is apparently caused by a fungus called *Malasseziarestricta* and *M.globosa*. *Malassezia* formerly called *pityrosporum* is a yeast causing infection of skin and scalp (Shuster, 1984).The replacement of cell on the scalp occurs slowly and is not visible to the eye. The process of change is happening every month. If this there will be disruption on the scalp which we call dandruff. Herbal shampoos are the cosmetic preparation that with the use of tradition Ayurveda herbs are meant for cleansing the hair and scalp just likes the regular shampoo. The various antifungal preparations for the treatment of dandruff. These products show many side effects such as loss of hairs, increased scaling, itching, irritation, and headache. Hence, there was small try to formulate herbal antidandruff shampoo which is effective in terms of safety and treating the dandruff condition and also improve the health of hairs.

- Hairs are the integral part of human beauty.
- Hair is a protein filament that grows from follicles on the dermis or skin.
- Scientific name of hair is pili or pilus.
- Hair is a component of the integumentary system and extends downward into the dermal layer where it sits in the hair follicle.
- The presence of hair is a primary differentiator of mammals as a unique class of organisms. In humans, it is a cherished and highly visible indicator of health, youth, and even class.
- It has a sensory function, protects from cold and UV radiation, and can have a significant
- Psychological impact when its growth or structure is deranged.
- At a microscopic level, the variety in length, color, diameter, and cross-sectional shape of each hair creates the characteristic profiles seen across ethnic groups and among individuals.

❖ HAIR ANATOMY

- Hair grows from hair follicles situated within the fatty layer of the scalp. Contrary to the popular belief that hair grows as single strands, hair follicles actually grow in groups of 1-4 hairs called “follicular units”
- At the base of each hair follicle is a hair bulb where the growth mechanism for producing hair occurs. Hair follicles get their nourishment from the blood vessels within the dermis. The cells divide and develop to produce the hair shaft.
- While the hair is still developing underneath the epidermis, it maintains a soft form. Once it pushes past the epidermis, its outside layer hardens into keratin.

❖ HAIR

- In humans it is a special and cherished feature, especially, in females, but its main functions are in protection of the skin from mechanical insults and to facilitate home therapy, eyebrows and eyelashes, for example, stop things entering the eyes, while scalp hair prevents sunlight, cold, and physical damage to the head and neck.

❖ STRUCTURE OF HAIR

- A hair is composed of columns of dead, keratinized cells welded together. The shaft is a straight hair is rounded in cross-section, that of wavy hair is elliptical or kidney shaped. The root is the portion of the hair deep into the surface that penetrates into the dermis and sometimes into the subcutaneous layer. The shaft and root both consist of three concentric layers-
 - **Medulla:** - It is the central part of the shaft and is generally noticeable in thick hair. It is composed of two or three rows of polyhedral cells containing pigment granules and air spaces.
 - **Cortex:** - It is located peripheral to the medulla and forms the major part of the shaft. It consists of elongated cells, containing pigment granules in dark hair while air in white hair
 - **Cuticle:** - It is a layer present in the outermost region of the hair. The cuticle has presence of thin heavily keratinized flat cells.

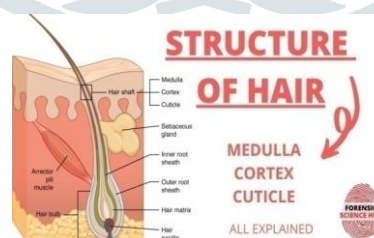


Figure 1 Physiology of hair

• HAIR PHYSIOLOGY:

- Anagen (growth phase): Most hair is growing at any given time. Each hair spends several years in this phase.
- Catagen (transitional phase): Over a few weeks, hair growth slows and the hair follicle shrinks.
- Telogen (resting phase): Over months, hair growth stops and the old hair detaches from the hair follicle. A new hair begins the growth phase, pushing the old hair out.

• PROBLEMS RELATED TO HAIR:

- Dandruff
- Dry hair
- Split ends
- Oily hair
- Frizzy hair

- Limp hair
- Hair loss
- Heat damage
- Color damage
- Grey hair

❖ **DANDRUFF:**

● **CAUSE OF DANDRUFF**

One cause of dandruff is the fungus *pityrosporum ovale* (P.ovale), which is naturally present on the scalp and other part of the skin. Generally this fungus causes no harm. However, with the weather changes, hormonal, and stress, the scalp will produce more oil, causing the fungus P. ovale to proliferate. With the proliferation of the fungus, itching of the scalp skin cell and the loss of hair follicles and so called dandruff will comes.

- Dry skin.
- Irritated, oily skin.
- Not shampooing often enough
- Malassezia-yeast like fungus

● **SYMPTOMS OF DANDRUFF**

- Symptoms of dandruff mainly include the following :-
- Presence of fragments.
- Itching of scalp.
- Redness around the scalp, forehead, and ears.



Figure 2 Excess dandruff in scalp



Figure 3 Redness on skin

- It is a harmless, chronic condition that occurs when the scalp becomes dry or greasy and produces white flakes of dead skin that appear in the hair or on the shoulders.
- Although it is harmless, dandruff can be embarrassing for those who have it
- Skin cells are formed continuously on the scalp, so the shedding of the dead skin cells is normal process. With dandruff, however skin cells are shed at a faster rate than normal. Oil from the scalp causes the skin cells to clump together and appear as white flakes.

● **TREATMENT :**

- Follow a healthy diet.
- Avoid stress.
- Shampoo uses a combination of special ingredients to control dandruff.
- Keeps your hair beautiful and blossomed.

❖ **SHAMPOO :**

Hair is an important part of human body to provide beauty. A shampoo may be described as a cosmetic preparation meant for the washing hair and scalp. The primary function of shampoo is cleansing of the hair. The additional fution of this preparation of herbal shampoo is to remove dandruff by using natural and herbal ingredients. Shampoos are widely used today based on synthetic ingredients or herbal ingredients.

A shampoo is a preparation of surfactant in liquid, solid or powder, whichever is suitable. It removes grease, dirt and skin debris from the hair shaft and scalp without adversely affecting the user. Finally the complete formulation of this herbal shampoo must be medically safe for long -term usage.

● **Herbal Shampoo :**

“Herbal shampoos are the cosmetic preparations that with the use of traditional ayurvedic herbs are meant for cleansing the hair and scalp just like the regular shampoo.” They are used for removal of oils, dandruff, environmental pollution, etc.

❖ TYPES OF SHAMPOO :

1. **Powder shampoo:** It is available in the form of dry powder, initially it was prepared from dry soaps, but nowadays dry synthetic detergents are used for their preparation.
2. **Liquid shampoo:** These are clear liquid preparations that are most widely used. They are usually made by using detergent of low cloud point. Some of these shampoos may be transparent.
3. **Cream shampoo:** These are called as lotion shampoos which are modification of clear liquid cream shampoos. Solubilizing agents such as magnesium stearate is also used to dissolve the added opacifier.
4. **Jelly shampoo:** These are transparent and thick usually made by incorporating a gelling agent, (e.g., cellulose). There is great use in hair salons and beauty parlors. The principle ingredient is detergent which can be used either alone or in combination with soap.
5. **Keratin shampoo:** When your shampoo (or any hair care product) is infused with keratin oil, you reap benefits that nourish and condition the hair. This helps it look shiny and smooth. It also helps to fight frizz, tame fly always, and protect against damage caused by styling tools like a straightening iron or blow dryer.
6. **Specialized shampoo:** Specialty shampoos are marketed to people with dandruff, color-treated hair, gluten or wheat allergies, an interest in using an organic product, infants and young children ("baby shampoo" is less irritating).

❖ ADVANTAGES OF SHAMPOO:

- Cleansing properties
- Improving hair hygiene.
- Treating scalp conditions.
- Treatment for dry scalp.
- Treatment for hair loss.
- Treatment for greasing or oily hair.
- Relieves itch and irritation.
- Repairs damaged hair.
- Shampoo keeps hair silky or smooth.

❖ DISADVANTAGES OF SHAMPOO:

- Sometimes it causes mild side effects such as dry hairs, hairfall, etc.
- Dryness & redness of the scalp.
- It damages the hairs.

❖ IDEAL PROPERTIES OF SHAMPOO:

- To make the hair smooth and shiny.
- Produce good amount of foam
- Should not cause irritation to scalp, skin and eye.
- Should completely, effectively remove dirt.
- Impart pleasant fragrance to hair.
- Good biodegradability

❖ MATERIALS AND METHODS

● Plant Profile and Other Ingredients-

The different parts of the plants were selected for the study having hair care property. The plants are lawsonia inermis (Henna), Phyllanthusemblica (Amla), Azadirachta indica (Neem), Aloe barbadensis (Aloevera), Fenugreek (Methi), Sapindus mukorossi (Reetha), Ocimum sanctum (Tulsi), Acacia Concinna (Shikakai), Citrus limon (Lemon), Water. The powder of methi, Amla fruit, Neem leaf, Shikakai fruit, Aloe leaf, Henna Leaf, Ritha fruit were collected from the local market. The raw materials collected were given with their respective biological source. The ingredients in the hair care; even they are responsible to provide the nutrition to the body. Herbs have long been associated with hair care and are often ingredients of conditioners, shampoos and rinses. The selection of active ingredients for hair care powder is often based on the ability of the ingredient to prevent damage to the skin as well as to improve the quality of the skin by way of cleansing, nourishing and protecting the skin. In the paper, we reported the development and evaluation of herbal hair care antidandruff Shampoo. ^(13, 14)

In this herbal preparation of antidandruff shampoo, the main active antidandruff constituent is the Azadirachta indica (Neem). The Neem has different activities like, antifungal antibacterial, etc.

❖ **List of ingredients:-**

- lawsonia inermis (Henna),
- Phyllanthusemblica (Amla),
- Azadirachtaindica (Neem),
- Aloe barbadensis (Aloevera),
- Fenugreek (Methi),
- Sapindus mukorossi (Reetha),
- Ocimumsactum(Tulsi),
- Acacia Concinna(Shikakai),
- Citrus limon(Lemon),
- Rose water,
- Water.

❖ **Azadirachtaindica: -**

Figure 4 Azadirachtaindica

- **Biological name** - Azadirachtaindica
- **Common name** – Neem
- **Marathi name** - Kadunimb
- **Synonym** - Neem, Kadunimb, margosa tree.
- **Family** - meliaceae
- **Biological source** - Fresh Leaves or dried leaves powder of azadirachtaindica.
- **Geographical source** – india is native of Azadirachtaindica. It also cultivated in Nepal , Pakistan, Bangladesh, and Sri-Lanka .
- **Morphological characters**- Neem is fast growing tree that can reach a height of 15-20 meters (49-66 ft). The fairly dense crown is roundish and may reach diameter of 20-25m.
- **Chemical constituents** - nimbin, nimbandiol, ascorbic acid, amino acids, 7-benzoylgedunin, 17-hydroxyazadiradione,etc
- **Description of Herb** -It is a large evergreen glabrous tree about 15 to 16 meters high.
- **Trunk:** the trunk of the plant is tough and grows straight.
- **Leaves:** Leaves are alternate, extipulate, 20 to 35 mm long, with serrated margin and are closely clustered towards the end of branches.
- **Flowers:** it bears small fragrant whitish flowers in summer arranged in simple racemes.
- **Fruits:** They are oval shaped berries about 1.25 to 2 cm elongated and are green in colour and turn yellow at maturity each berry bears single seed. They are bitter in taste.
- **Bark:** The bark is moderately thick , rough, brown in colour . it is furrowed longitudinally and obliquely, its internal part is starchy white, laminated with characteristic smell of neem.
- **Microscopical characters-**
 - **Leaves -**
 - **Colour-** dark green
 - **Odour-** characteristics
 - **Taste-** intensely bitter
 - **Shape-** leaf petioles are short , leaflets are more assymetrical and margin in dentate and euneate.
 - **Chemical Constituents** :- Chemicals are isolated from the plant belong to the classes diterpenes (Sugiol), nimbol (Bark) , triterpenes : stimasterol (leaf) etc. The neem leaves contain not less than 1.0% w/w of Rutin.
- **Uses-**
 - Topical application can help to treat worms, insect and mosquito bite.
 - It also helps ageing skin, and any kind of skin irritation or itching.

- Act as antifungal agent.
- Act as antibacterial agent.
- Cures dandruff.
- Relives dryness and itching
- Aids digestion.
- Control blood sugar.
- Prevent skin problems.
- Eliminates acne-causing bacteria.
- Prevent hair loss.
- Kills lice in hairs.
- **Isolation and Extraction technique:** – The fresh neem leaves were collected from 10 years old neem tree. The fresh leaves are soaked in tap water for remove the dust and impurities. Then boil the 1 liter of water after boiling add neem leaves in it. Store it for 24 hours then filter the extract. Then use this extract for formulation purpose.

❖ Lawsonia Inermis-



Figure 5 Lawsonia inermis

- **Biological Name:-** Lawsonia inermis
- **Synonyms:** - Egyptin Private, Lawsonia – Alba.
- **Common Name :-** Heena
- **Biological Sources:** - Heena Consist of Fresh or Dried Leaves of Plant Lawsoia Inermis.
- **Family:** - Lythraceae.
- **Geographical Sources:** - Heena is indigenous to Africa and is largely cultivated in Egypt, Sudan, Caribbean Island, Florida, India and China.
- **Macroscopic Characters :-**
 - **Color :-** Greenish Brown
 - **Odor :-** Characteristic
 - **Taste :-** Bitter and Astringent
- **Chemical Constituents :-**
 - The active constituents of the leaf is lawsonone [0.5-1.0 %] other constituents are 5-10 % gallic acid, white resin, sugars and tannis and xanthones . And colouring agent is degradation product of primary glycosides A, B, &C.
- **Uses :-**
 - Henna is used as a favorite hair dye
 - Lawsonsone are active constituents of the leaves is shown antibacterial
 - It shows antifungal properties.
 - Regulate oil secretion.
 - Prevent hair fall.
 - Help to prevent dandruff.

❖ Phyllanthusemblica



Figure 6 Phyllanthusemblica

- **Biological Name-** Phyllanthusemblica
- **Synonyms :** -Emblica , Indian goose Berry , Amalki
- **Common Name :-** Amla

- **Biological Sources:** - This con consists of dried, as well as fresh fruits of the plant Emblica Officinalis Gaerth Phyllanthus emblica Linn. Belonging to family Euphorbiaceae.
- **Geographical Source :-** It Is a small or medium tree found in all deciduous forests of India. It is also found in Sri Lanka & Myanmar. The leaves are feathery with small oblong pinnately arranged leaflets. The tree is characteristics greenish grey with smooth bark.
- **Macroscopic Characters :-**
 - **Color :-** The green colour changes to lightly yellow or brick red at maturity.
 - **Odor :-** Odorless.
 - **Taste :-** The taste of amla is score and astringent.
 - **Size :-** 1.5 & 2.5 cm in diameter.
 - **Shape :-** The Fruits are depressed , globular
- **Chemical Constituents :-** Amla fruits is a rich natural sources of vitamin C (Ascorbic Acid) and contains 600-750mg per 100 g of the fresh pulp. Fruits are also containing 0.5 % fat , phyllembin and 5 % tannin. The fresh fruits contain 75% moisture . The frits are dehydrated and stored.
- **Uses -**
 - Strengthen the scalp and hair.
 - Reduce the premature pigment loss from hair, or greying.
 - Stimulate the hair growth.
 - Reduce the hair loss.
 - Prevent or treat dandruff and dry scalp.

❖ ALOEVERA



Figure 7 Aloe barbadensis

- **Biological name :** - Aloe barbadensis
- **Synonyms :-** Aloe , Musabber , Kumari.
- **Common Name:-** Aloe vera
- **Biological Sources :-** Aloes is the dried juice of the leaves of Aloe Barbadensis Miller, Known Curacao aloes or of Aloe Perryi Beker, known as Socotrine Aloes , or of Aloe Ferox Miller and hybrids of this species with aloe Africana Miller and Aloe Spicata Baker , Known as Cape Aloes , Belonging to family Liliaceae.
- **Geographical Source :-** Aloes is indigenous to eastern and southern Africa and grown in cape colony, Zanzibar and Islands of Socotra. It has also cultivated in Caribbean island , Europe and many parts of India including North West Himalayan Region.
- **Macroscopic Characters:-**
 - **Color-** slightly yellow, green
 - **Odor** -sour smell
 - **Taste** – bitter
 - **Size-** 60-100cm and up to 18-inch-tall leaves.
- **Chemical Constituents :-** All the varieties of aloe are major sources of anthraquinone glycosides. The principal of composition of aloe is aloin , which is a mixture of glucosides . It is chemically aloe – emodin anthrone C – 10 glucosides and it is water soluble.
- **Uses :-**
 - Deep clean oily hairs.
 - Strengthens and repairs hair strands.
 - Promote hair growth.
 - Make hair smooth and silky.

❖ **Ocimum sanctum:-**Figure 8 *Ocimum sanctum*

- **Biological Name:-** *Ocimum sanctum*
- **Synonyms :-** Sacred basil, Holy Basil.
- **Common name:-** Tulsi
- **Biological Sources :-** Tulsi Consist of fresh and dried leaves of *Ocimum Sanctum* Linn.(Syn. *Ocimum tenuiflorum*) Family Lamiaceae , and consist not less than 0.40% eugenol on dried basis.
- **Geographical Source :-** It is a herbaceous , multi branched annual plant found throughout India. It is considered as sacred by Hindus. The plant is commonly cultivated in garden and also grown near temples . It is propogated by seeds.
- **Macroscopic Characters :-**
 - **Color** – Green
 - **Odor** – Pleasant clove sent
 - **Taste** -Astringent, sometime bitter flavor.
- **Chemical Constituents :-** Tulsi leaves contain bright, yellow coloured and pleasant volatile oil. The oil content of the drug varies depending upon the type , the place of cultivation and season of its collection . It contains 70 % eugenol, carvacrol and eugenol- methyl –ether. It also contains caryophyllin.
- **Uses :-**
 - Helps to maintain moisture in scalp.
 - Improve blood circulation.
 - Treating premature graying of hairs.
 - Reduce the hair fall.
 - It shows antibacterial activity.

❖ **Fenugreek –**Figure 9 *Fenugreek*

- **Biological name:** Fenugreek
- **Synonym :-** Methi
- **Common Name:-** Methi
- **Biological Source: -** It consists of dry leaflet and ripe dried seeds of Cultivated plants *Trigonella Foenum – graecum* Linn; Family: Fabaceae. It should contain not less than 0.1% W/W of trigonelline on dry basis.
- **Geographical source: -** It is found growing wild in Punjab and Kashmir and all over India.
- **Microscopic Characters :-**
 - **Color :-** Seeds are brown to reddish brown in colour
 - **Odor: -** Strong, Aromatic.
 - **Taste :-** Bitter
 - **Size: -** 3-5 X 2-3 mm & 1.5 to 2.0 mm thick.

- **Chemical Constituents:** - Methi seeds contain 3.0% of mucilages, 5.0% Fixed Oil, Steroidal Saponins 0.5-1.5% and 20% of proteins. Two alkaloids trigonelline and choline are present in the seeds. Saponin Trigofenoside – A on hydrolysis release diosgenin, yamogenin, trigogenin, smilagenin and sarsapogenin. Flavonoids, vitexin, saponaritin , triterpenoid saponin botulin and lupeol are present .
- **Uses:-**
 - Fight dandruff
 - Prevent premature graying of hairs.
 - Control scalp inflammation.
 - Adds shine and soft texture.

❖ Citrus limon



Figure 10 Citrus limon

- **Biological name:-**Citrus limon
- **Synonyms :-** Lemon peel, Limonis Fructus, Limonis Cortex
- **Common Name:-** lemon
- **Biological Source :-** Lemon is the fruit of Citrus limon (L.) Burm., a small tree of the family Rutaceae.
- **Geographical Source :-** Lemons are widely cultivated in many countries of the world including Africa, the Mediterranean countries, Australia, many European and North and South American countries.
- **Microscopical Characters:-**
 - **Color :** Yellow
 - **odor :-** an aromatic bitter taste.
 - **Shape:-** The whole fruit is ovoid or obovoid.
 - **Taste :-**acid taste.
- **Chemical Constituents:** - Citrus limonene has been analyzed for their content of nutrient, carbohydrates, protein, fats, sodium or cholesterol. carbohydrates 9.32 g, Fat 0.30 g, zinc, 0.06 mg (1%), calcium 26 mg (3%) , potassium 138 mg (3%), magnesium, 8 mg (2%), iron – 0.60 mg (5%), phosphorus 16 mg (2%), protein 1.10 g, riboflavin is also known as Vit. B2 0.020 mg (1%), thiamine also known as vitamin B1 0.040 mg 3%, pantothenic acid (B5) – 0.190 mg (4%), ascorbic acid also called vitamin C 53.0 mg (88%)
- **Uses :-** Shampoos often include citric fruits, like lemon, for their fragrant smell and ability to adjust the scalp to a 5.5 pH. This helps to: maintain neutrality. prevent any adverse reactions and inflammation on the skin.

❖ Acacia concinna



Figure 11 Acacia Concinna

- **Biological Name :-** Acacia concinna
- **Biological Source:** - It consists the fruits of the plant Acacia concinna Linn. (Leguminosae)
- **Geographical Source:** - It is a medicinal plant that grows in tropical rainforests of southern Asia and is used for washing hair.

- **Organoleptic characters-**
 - **Color-** dark brown
 - **Odor-** odorless
 - **Taste-** Pungent
- **Chemical constituents-**It principally consists of arabin, which is a complex mixture of calcium, magnesium and potassium salts of Arabic acid. Arabic acid upon hydrolysis give L-arabinose, L-rhamnose, D-galactose and D-glucuronic acid. It also contains oxidase and peroxidase enzyme. Bark and pods have saponins which form the foam.
- **Uses -**
 - It is traditionally used in a shampoo preparation for hair growth.
 - Soothes Scalp.
 - Fights Dandruff. Shikakai also has antifungal properties that help curb dandruff.
 - Nourishes hair follicles.

❖ REETHA :-



Figure 12 Sapindus Mukorossi

- **Biological name-** Sapindus mukorossi
- **Synonym-** Soap nut, Aritha
- **Biological source-**
- It consist of the dried as well as fresh fruits of the species *Sapindus mukorossi*
- **Family-** Sapindaceae.
- **Organoleptic character-**
 - **Color-**Brick red
 - **Odor-**Aromatic
 - **Taste-**Pungent
 - **Shape-** Circle
 - **Size-**1 to 2 cm
- **Chemical constituents-** Seeds of *Sapindus mukorossi* contain 23 % oil of which 92 % is triglycerides. Fruits and roots contain triterpenoid saponins named Sapindoside A&B. Fruits also contain sesquiterpenoidal glycosides and six different fatty ester of tetracyclic triterpenoids.
- **Uses-**
 - Cleanses the skin of oily secretion and is even used as a cleanser for washing hair.
 - Seeds of *Sapindus mukorossi* are used in Ayurvedic medicine to remove tan and freckles from the skin.
 - *Sapindus mukorossi* can also be used as a natural remedy for many health problems, such as for treating migraine headaches.
 - It is widely used in Ayurveda for poison case.

❖ FORMULATION

- **Composition of shampoo**
 - **Surfactants-** This is the surface-active agents. This is the main component of shampoo. This provides the detergency and foam.
 - **Conditioning agents-** The conditioning agents are conditioner the hairs and give the smoothing hairs.
 - **Antidandruff agents-** This agent are removing the dandruff from scalp, mainly in chemical shampoos the selenium sulfide is commonly used.

- **Foaming agents**
- **Pearlescent agent**
- **Thickening agents**
- **Colors, perfumes, and preservatives.**

In this formulation of herbal anti dandruff shampoo we have used the all natural ingredients.

- Antidandruff agent- Neem, Shikakai.
- Antibacterial agent :- Tulsi, Neem.
- Foaming agent :- Reetha, Shikakai.
- Surfactant :- Shikaki.
- Conditioning agent :- Heena, Methi, Aloevera.
- Thickening agent :- Aloe vera.
- Coloring agent :- Amla, heena.
- Perfume :- Lemon , Rose water.

Composition of developed formulation is summarized. Aqueous extraction of Azadirachta indica was divided in two parts. First part was added with herbal extract and second part was used for the mix powder of reetha and shikakai. Both parts were mixed. To the mixture perfume and juice of citrus limon was added with stirring. Shampoo formulation was filtered and make up the volume using the liquid extract of neem. Developed shampoo was stored in suitable container and used for the further evaluation.

Table 1. Composition of shampoo

Sr. No.	Ingredients	Quantity (in gm)		
		F ₁	F ₂	F ₃
1	Lawsonia inermis	1	0.5	0.2
2	Phyllanthusemblica	2	1	0.5
3	Aloe Barbadensis	3	3	5
4	Fenugreek	1	0.5	0.5
5	Sapindus Mukorossi	4	3	5
6	Ocimumsacatum	2	1	1
7	Acacia Concinna	4	3	5
8	Citrus Lemon	q.s	q.s	q.s
9	Rose Water	q.s	q.s	q.s
10	Liquhtaindid extraction of Azadiracta Q.S.	100ml	100ml	100ml

❖ EVALUATION PARAMETERS

After the formulation shampoo some evaluation test was done.

1. **Physical appearance/ visual inspection:** - The prepared formulation was evaluated in terms of their clarity, color, and odor
2. **Determination of pH :-** 10% v/v shampoo solution was constituted in distilled water and the pH of the solution was determined at room temperature .

3. **Determination of solid contents:** - A clean dry evaporating dish was weighed and 4 grams of shampoo to the evaporating dish. The dish and shampoo was weighed. The exact weight of the shampoo was calculated only and put the evaporating dish with shampoo was placed on the hot plate until the liquid portion was evaporated. The weight of the shampoo only (solids) after drying was calculated.
4. **Wetting Time:** - The canvas was cut into 1-inch diameter discs having an average weight of 0.44g. The disc was floated on the surface of shampoo solution 1%w/v and the stopwatch started. The time required for the disc to begin to sink was measured accurately and noted as wetting time.
5. **Cleansing action (Nature of hair after wash):-** The cleansing property of the herbal shampoo was evaluated by the application of the shampoo on the hair that has not been washed for seven days. The shampoo was used to be hairs of humans.
6. **Skin irritation Test :-** Prepare herbal shampoo was applied on the skin for 10 minutes after that was washed and tested for the irritation or inflammation to the skin .
7. **Dirt Dispersion Taste:** - Two Drops of shampoo were added in large test tube contain 10 ml of distilled water. One drop of ink was added in the test tube was stopped and shake for 10 times the amount of ink in the foam was estimated as none, light, moderate or heavy.
8. **Foaming ability:-**Cylinder shake method was used for determining foaming ability. 50 ml of 1% shampoo solution was put into a 250 ml graduated cylinder and covered the cylinder with hand and shaken for 10 times. The total volume of the foam contents after 1 minutes shaking was recorded. The foam volume was calculated only. Its repeat for 4 min.
9. **Stability Study:** - Stability and acceptability of organoleptic properties (odor and color) of formulation during the storage period of one month indicated that they are chemically and physically stable.

❖ RESULT

Table 2. Physical Appearance Test.

Sr. No.	Physical Appearance	F1	F2	F3
1.	Color	Dark Brown	Dark Brown	Dark Brown
2.	Odor	Good	Good	Good

Table 3. pH Test

Sr. No.	F1	F2	F3
1.	5	5	5

Table 4. % Of Solid Content Test

Sr. No.	F1	F2	F3
1.	3.4%	3.2%	3.4%

Table 5. Wetting Time Test

Sr. No.	F1	F2	F3
1.	4 Sec	2 Sec	2 Sec

Table 6. Cleansing Action Test (Nature of Hair After Wash)

Sr. No.	F1	F2	F3
1.	Soft	Soft	Soft

Table 7. Skin Irritation Test

Sr. No.	F1	F2	F3
1.	No Irritation	No Irritation	No Irritation

Table 8. Dirt Dispersion Test

Sr. No.	F1	F2	F3
1.	Light	Moderate	Moderate

Table 9. Foaming Ability Test

Sr. No.	Time (Min)	F1	F2	F3
1.	1	55 ml	54 ml	55 ml
2.	2	57 ml	55 ml	56 ml
3.	3	58 ml	56 ml	56 ml
4.	4	60 ml	55 ml	55 ml

Table 10. Stability Study Test

Sr. No.	F1	F2	F3
1.	Stable After 1 Month	Stable After 1 Month	Stable After 1 Month

❖ CONCLUSION

Dandruff is the scalp conditions that affects the 50% of human population and affects the social behavior of the sufferer along with possessing the unhealthy hairs. This formulation can decrease the dandruff and control the hair loss also and increases the beauty of hairs. The anti-dandruff shampoo was formulated by using the liquid extract neem leaves. This is beneficial for the control the dandruff and cure the fungal infection and microbial infection. The formulation containing the anti-dandruff agents with longer effect. The formulation and evaluation of herbal anti-dandruff shampoo was studied.

In present scenario, it seems improbable that herbal shampoo, although better in performance and safer than the synthetic ones, will be popular with consumers.

Further from the present study it can be concluded that herbal shampoos are formulated and are better in performance as that of the marketed formulation but further research is required for betterment of its quality.

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