

Research Article: Development and Evaluation of Antidandruff Shampoo Based on Herbal Source

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Abstract:

Shampoo are a common cosmetic item used in daily life. It is the cosmetic preparation intended to clean the hair by removing the dirt from the hair shaft and scalp. In the current outline it seems unlikely that herbal shampoo although better performing and safer than synthetic shampoo. Synthetic shampoo shows harmful effect on the hair and scalp such as hair dryness and keratin loss for this reason the herbal shampoo has been developed. The formula of herbal shampoo using extract such as Sapindus mokeros , Emblica officinalis, Acacia concinna , Ocimum sanctum , Eclipta prostrata , Trigonella foenum graecum in different proportions. The evaluation test has been performed like organoleptic, wetting time test, physicochemical pH, detergency, dirt dispersion, stability have been accomplished. The main aim of this study was to remove harmful synthetic ingredient from antidandruff shampoo formulation and replace them with natural ingredients.

Keywords: Herbal Shampoo , Antidandruff, Natural, Evaluation of Shampoo, Formulation.

Introduction:

Cosmetics are product used to improve the appearance and odor of the body ^[1]. These products are available in various forms, including lotions, creams, powders, shampoos etc. Cosmetics are used to clean, protect and moisturize the skin ^[2]. Simultaneously with skin care our hair routine is also considered an important factor.

Hair are epidermal growth found almost all over the body . However, they are missing only in the periphery of the palm and in the areas around the padded surface of the palm and feet, lips, and urogenital opening. Hair is made up of row of dead keratinocytes that are connected to each other. The hair shaft is the superficial part of the hair that produce from the surface of the skin. The hair shaft of straight hair is around in cross section, the hair shaft of wavy hair is oval, and the hair shaft of curly hair is oval or kidney shape. The root is that the portion of the hair deep into the surface, penetrating the dermis and sometime the subcutaneous layer ^[4,19].

Both the axis and the root are composed of three concentric layers.

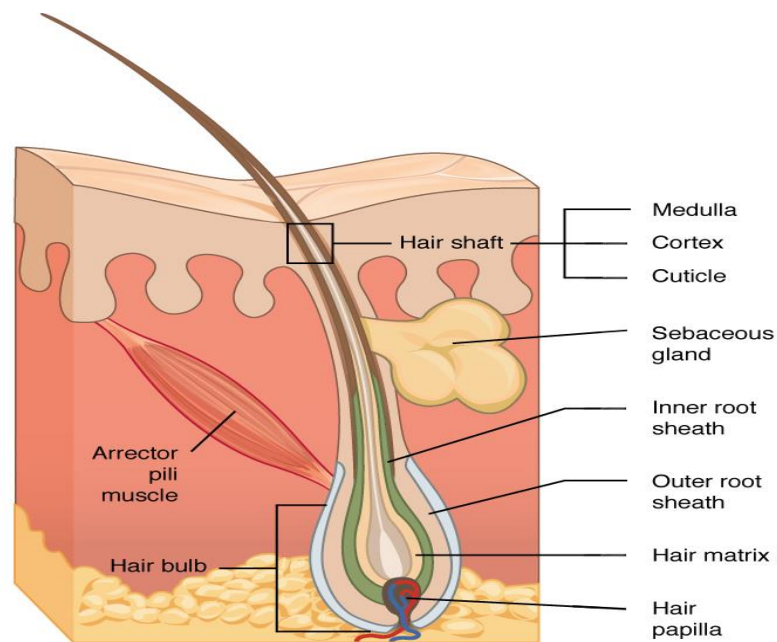


Fig 1. Human Hair Diagram.

Medulla: It is the central part of the shaft and is identified primarily by its dense hair. It consists of two or three rows of polyhedral cells containing pigment granules and air space.

Cortex: Located on the periphery of the medulla and forming a key part of the axis. It is composed of elongated cells with pigment particles in black hair and air in white hair.

Cuticle: This is the outermost layer of hair and consists of thin, flat layers of keratinocytes. A shampoo is a hair care product that is usually a viscous liquid. The major role of shampooing is to clean hair, scalp, to eliminate dirt, dandruff, pollutants and other external substances that attach to the hair. In addition, it should produce foam, be easy to remove, and have a pleasant odor. Its mechanism includes several physical phenomena such as moisture, opacity, emulsification, and peptization^[3].

Herbal shampoo is important because now people prefer it over chemical products because chemicals have harmful effects and people are more aware of the need for cosmetics containing natural ingredients. Herbs are becoming more popular as consumers view them as risk-free and without side effects. Using herbal shampoo is crucial as modern consumers prefer natural products over synthetic ones as they are proven to be more effective^[4].

Nowadays, natural sources are still mainly attractive when compared to synthetic, so herbal shampoo is popular with consumers when compared to synthetic^[5].

Shampoo is a preparation of a surfactant in an appropriate form—powder, solid, liquid—which when used under specific conditions, removes surface grease, dirt, and skin residue from the hair shaft without adverse effects to the user. Hair is an integral part of the human body. Generally, hair care products convey the hair texture. Herbal shampoos are very beneficial for hair^[6].

History:

In the Indian subcontinent, various herbs and their extracts have been used as shampoo on the Indian subcontinent since ancient times. The first origin of shampoo comes from the Indus Valley Civilization. A

very effective early shampoo was made by boiling species with dried Indian gooseberries (Amla) and a selection of other herb using the strained extract. Sapindus, also known as soapberries or soap nuts, is a tropical tree widely distributed in India known in ancient Indian text as ksuna, and its fruit pulp contain saponins which are natural reagent.

The extract of the soap berries create a dilution called phenaka by the Indian text. It leaves hair soft, shiny and manageable. Other hair washing products includes Shikakai (Acacia Concinna) the founder and first Guru of Sikhism, Guru Nanak who referred to soapberries and soap in the 16th century. Cleaning the hair and body during the daily bath was an indulgence of early colonial traders in India .When they return to Europe, they introduced a new habit including shampooing their hair^[8].

Benefits of Herbal Shampoo :

1. Gives more shine to the hair
2. Stronger hairs
3. Completely natural and chemical free
4. Does not irritate skin or scalp
5. Store healthy natural oil^[7].

Function of Herbal Shampoo:

1. Lubricating
2. Maintain hair colour ^[9].

Need of Shampoo:

Your skin and scalp are moisturized by sebum an oily substance. Without shampoo sebum can quickly build up making your hair greasier. Sebum also attracts microfauna which can lead to dandruff and hair problems. Shampooing is mandatory to remove sebum from scalp as well as any detect of other hair products. An often-washed scalp can also get dry. Shampoo containing harsh chemicals can wash away from your scalp causing flaking. Additionally washing in extremely hot water can result in broken hair ends and flakey skin^[11].

Types of Herbal Shampoo:

- Powder shampoo
- Solid shampoo
- Clear liquid shampoo
- Jelly shampoo
- Aerosol shampoo
- Anti dandruff shampoo
- Moisturizing shampoo
- Conditioning shampoo
- Baby shampoo
- Two layer shampoo
- Medicated shampoo ^[12].

Ideal features of Herbal Shampoo:

1. The main feature of herbal shampoo is to remove dust and oil from the surface of the hair fibers and the scalp.
2. It promotes hair growth, creates volume, increase blood circulation and promotes hair follicles health.
3. It should effectively and completely eliminate dirt and soil, excess sebum or other fatty substances and free comeal cell from hair.
4. Leave the hair undry, soft, shiny with good handling and minimal flying distance.
5. It should give the hair a pleasant smell.
6. It should not cause side effects or irritation to the skin or eyes^[13].

Desired properties of Herbal Shampoo :

1. Easy to apply
2. Clear extra debris
3. Low irritation
4. Good fragrancy
5. Low toxicity^[10,18].

Composition of Herbal Shampoo:

Surfactant
Anti dandruff agent
Conditioning agent
Foaming agent
Thickening agent
Fragrance
Preservative
Ph adjuster^[6].

Advantage of Herbal Shampoo :

1. Herbal shampoos are free from chemical, sulphate and synthetic fragrance.
2. Herbal shampoo show the nourishment properties and help moisturize and moisturize hair, while maintaining their natural pH balance.
3. Herbal shampoos are rich in vitamin, antioxidants and essential oil which promotes healthy hair growth and minimizes damage.
4. Herbal shampoo provide the cleaning of the scalp skin and hair.
5. Herbal shampoo often respond to specific hair problem such as hair dandruff control, hair loss reduction etc.^[16].

Importance of Herbal Shampoo:

1. The shampoo work as a cleaning agent to get rid of the dry flakes and it also remoisturizes the scalp so that dandruff won't come back as easily.
2. Helps by treating the dryness and flakes and it also prevent new flakes from forming^[15].

Limitations of Herbal Shampoo:

1. Natural product affect product consistency and quality control.
2. If it is less stable it is necessary to add preservative.
3. Seasonal variation of plant components ^[14].

Functions of Ingredients:**1. Fenugreek**

Fenugreek seeds are rich in protein which help to strengthen the hair and prevent breakage. They contain lecithin, an emulsifying substance that hydrates and conditions the hair. Fenugreek also help to reduce dandruff and scalp irritation due to its anti-inflammatory properties. It can promote hair growth by improving blood circulation to the hair follicles^[3,4,19].

2. Amla

Amla is a rich source of vitamin c which helps in the production of collagen , an essential protein for hair. It nourishes the hair and scalp promoting healthy hair growth. Amla can reduce dandruff, prevent hair thinning and strengthen hair follicles. It imparts natural shine and luster to the hair.

3. Tulsi

Tulsi is known for its anti-inflammatory and antimicrobial properties which help to combat scalp infection. It promotes hair health by improving blood flow to the scalp aiding in hair growth. The antioxidant in Tulsi protect hair from damaged caused by free radicals. The antioxidant in Tulsi protect hair from damage caused by free radical. It can reduce hair fall and dandruff making your hair stronger and shinier.

4. Ritha

Ritha is a natural cleanser that has been traditionally used as a hair cleanser in Ayurveda. It helps to remove excess oil and dirt from the scalp , preventing clogged pores. Ritha makes hair soft and manageable while adding a natural shine. It can be used to treat conditions like dandruff and itchy scalp.

5. Bhringraj

Bhringraj is often called “the king of herbs for hair” in ayurveda due to its hair-rejuvenating properties. It strengthens hair roots, reduce hair fall and promotes hair growth. Bhringraj oil or paste can improve the overall quality and texture of hair. It helps in preventing premature graying of hair and maintain its natural colour.

6. Shikakai

Shikakai is a natural hair conditioner that helps to soften the hair. It contains saponins that cleanse the hair without stripping it of its natural oil. Shikakai is known for promoting hair growth, reducing hair fall and prevent premature graying. It adds volume and thickness to the hair making it look healthier.

Functions of chemicals:

Sodium benzoate: They act as a preservative that prevent the growth of bacteria, molds and fungi in shampoo.

Essential oil: It is used for shiny and scented hair.

Gelatin solution: As a vehicle.

Citric acid: To adjust the pH of the shampoo.

Ingredients used in herbal shampoo:

1. Fenugreek (*Trigonella foenum graecum*)



Fig 2: Fenugreek

Synonym: Methi, Fenugreek Seed, Trigonella

Family: Leguminous

Biological Source: It consists of dried ripe seed of *Trigonella foenum graecum*

Uses

1. May reduce hair loss and sheeding
2. Antimicrobial dandruff treatment
3. Strengthen hair and adds shine
4. Good hair conditioner
5. Promotes a healthy scalp

2. Shikakai (*Acacia concina*):-



Img. 2: Shikakai

Synonym: Vimla, Bhuriphena

Family: Mimosaceae

Biological Source: It is the dried gummy exudation of stem and a branch of *acacia concina*

Uses:

1. Crubs hair loss

2. Prevent lice , Psoriasis and Scabies
3. Prevent splitends

3 Amla (*Emblica officinalis*)



Img. 3 : Amla

Synonym: Emblica , Indian gooseberries

Family: Euphorbiaceae

Biological Source: That consists of dried as well as fresh fruit of plant *Emblica officinalis*

Uses:

- 1 Prevent premature graying of hair
- 2 Treat irritation of itching of hair
- 3 Controls dandruff
- 4 Strengthen hair

4 Reetha (*Sapindus mukorossi*)



Img. 4 : Reetha

Synonym : Soap nut , Wash nut

Family : Sapindaceae

Biological Source : It is a dried fruit of the species of *sapindus mukorossi*

Uses :

- 1 Good for hair growth
- 2 Reetha increases the silkness of hair

- 3 Used as foaming agent
- 4 It clean the oily secretion and used as cleanser

5. Bhringraj (Eclipta prostrata)



Img. 5 : Bringraj

Synonym : Kesharanjana , Keshraja , Bhunga

Family : Asteraceae

Biological Source : This plant is known for its extraordinary therapeutic properties. It is one of most widely used plant in traditional systems of medicine such as Ayurveda , Sidha and Unani.

Uses :

- 1 Treat dandruff and bacteria on the scalp
- 2 Effective in reducing stress induced hair fall
- 3 Makes hair lustrous

Material and Method :

Formula : Preparation of herbal shampoo

Sr.No	INGREDIENTS	F1		F2		CATEGORIES	PARTS OF PLANTS
		QTY. GIVEN (FOR 1000gm)	QTY. TAKEN (FOR 12gm)	QTY. GIVEN (FOR 1000gm)	QTY. TAKEN (FOR 10gm)		
1	Reetha extract	1%	12gm	1%	10gm	Foaming agent	Dried fruit
2	Amla extract	1%	12gm	1%	10gm	Promotes hair growth	Dried fruit
3	Shikakai extarct	1%	12gm	1%	10gm	Detergent	Dried seed

4	Tulsi extract	1%	12gm	1%	10gm	Antibacterial agent	Dried leaves
5	Fenugreek extract	0.5%	6gm	0.5%	5gm	Softening agent	Dried seeds
6	Ashwagandha extract	1%	12gm	1%	10gm	Antioxidant	Dried root
7	Sandalwood oil	0.1ml	0.01ml	0.1ml	0.01ml	Fragrance	-
8	Sodium benzoate	1ml	0.5ml	1ml	0.5ml	Preservative	-
9	Gelation solution	5% (q.s)	q.s	5% (q.s)	q.s	Base	-
10	Sodium lauryl sulphate	q.s	q.s	q.s	q.s	Foaming agent	-
11	Citric acid	1%	q.s	1%	q.s	To adjust pH	-

Methods :

different parts of plant to study their hair care properties. Sample Selected collection – Sapindus mukorossi (Reetha) , Acacia Concima (Shikakai) , Phyllanthus Emblica (Amla) , Trigonella foenum graecum (Fenugreek), Ocimum tenuiflorum (Tulsi) , Withania somnifera (Ashwagandha) were collected in dried form from Shrirampur market.

Formulation 1

● Preparation of plant extract

Reetha Extract : 12 gm of reetha powder in 70 % ethyl alcohol.

Amla Extract : 12 gm of amla powder in 50 ml water and boil.

Shikakai Extract : 12 gm of shikakai powder boiled in 50 ml water.

Fenugreek Extract : 6 gm of fenugreek powder in 25 ml water.

Tulsi Extract : 12gm of tulsi powder in 50ml water.

Ashwagandha Extract : 12gm of ashwagandha powder in 50ml water.

Gelatin Solution : Boil 50 ml of water and add 1 gm gelatin powder and again boil for 4 min. Then mix all the extract and triturate together.

● Procedure

- 1 The plant extract are mixed in different proportion to obtain a shampoo.
- 2 Add 10 % gelatin solution to the herbal extract and shake to mix for 20 min. Citric acid and sodium benzoate were added.
- 3 Finally , add sufficient 1% citric acid solution to adjust the pH of the solution.
- 4 Add a few drops of sandalwood oil to impart fragrance to the prepared shampoo and the final volume was made 50 ml with gelatin solution.

Formulation 2

● Preparation of plant extract

Reetha Extract : 10 gm of reetha powder in 70 % ethyl alcohol.

Amla Extract : 10 gm of amla powder in 50 ml water and boil.

Shikakai Extract : 10 gm of shikakai powder boiled in 50 ml water.

Fenugreek Extract : 5 gm of fenugreek powder in 25 ml water.

Tulsi Extract : 10gm of tulsi powder in 50ml water.

Ashwagandha Extract : 10gm of ashwagandha powder in 50ml water.

Gelatin Solution : Boil 50 ml of water and add 1 gm gelatin powder and again boil for 4 min. Then mix all the extract and triturate together.

● Procedure

- 1 The plant extract are mixed in different proportion to obtain a shampoo.
- 2 Add 10 % gelatin solution to the herbal extract and shake to mix for 20 min. Citric acid and sodium benzoate were added.
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- 4 Add a few drops of sandalwood oil to impart fragrance to the prepared shampoo and the final volume was made 50 ml with gelatin solution.

Evaluation of shampoo formulation :

A. Physical appearance/Visual inspection:

The developed formulation were evaluated for clarity , color and odor.

B. Determination of Ph:

The developed formulation was diluted with distilled water to prepare a sample with a concentration of 10%. The prepared sample was checked using a pH meter at room temperature.

C. Dirt dispersion:

In a big test tube filled with 10 ml of distilled water two drops of india ink was added. The test container was sealed and shaken ten times. It was judged that there was none , light , moderate or substantial ink in the foam.

D. Surface tension:

Estimation were done with a 10% shampoo dilution in distilled water at room temperature. Completely clean the stalagrometer using purified water. Since surface tension is impacted with oil or different greases.

Calculated by following equation given below:

$$R3 = (W3-W1) n1 \times R1 / (W2-W1) n2$$

Where W1 = weight of empty beaker

W2 = weight of beaker with distilled water

W3 = weight of beaker with solution of shampoo

n1 = no.of drops of distilled water

n2 = no.of drops of shampoo solution

R1 = surface tension of distilled water at room temperature

R2 = surface tension of shampoo solution

E. Determination of percentage solid content:

Four gram of shampoo were placed to a clean dry china dish which was then weighed. It was determined how much the shampoo weighed precisely. The heated plate was used evaporated. After drying the weight was calculated.

F. Foaming ability and Foaming stability:

The stabilization test and foaming ability are measured using the cylinder shake method. This approach involves filling a graduated cylinder with 50 ml of 1% shampoo solution then covering the cylinder with hand. After then the cylinder is shaken for 10 times. The amount of foam resulting from studying is measured every minute for a total of five minutes.

Observation Table and Calculation

1 - Foam Index:

Sr.No	No.of test tubes containing ml of stock solution	Height of foam in cm
1	1ml	0.7
2	2ml	1.1
3	3ml	1.5
4	4ml	2
5	5ml	2.5

Calculation:

1 – Foaming Index : = 1000/A

Where, A = Volume of decoction having exact 1cm height

Therefore, Foaming index = 1000/2
= 500

2 - % Solid Content:

Calculation:

1. Weight of empty evaporating dish (A) = 140.14
2. Weight of evaporating dish after evaporating (B) = 144
3. Weight of sample (B) – (A)
= 144-140.14

Total solid content = 0.77

Therefore % solid content = (B-A)/ 4 x 100
= 144-140.14/4 x100
= 19.25%

3) Dirt Dispersion Test: Light in colour

Result and Discussion:

Formulated and evaluated herbal shampoo.

Sr.No	Parameter	F1	F2
1	Physical apperance	-	-

A	Colour	Brownish	Brownish
B	Odour	Pleasant	Pleasant
C	Apperance	Turbid	Turbid
2	Dirt dispersion	Medium	Light
3	Wetting test	40sec	63sec
4	Foam index	480	500
5	Determination of pH	4.5	5.3
6	Texture	Smoot	Smooth
7	% Solid content	17.15%	19.25%
8	Detergency and Cleaning	Good	Good

Discussion:

The shampoo was formulated by mixing equal amount of aqueous extracts of all ingredients with soapnut. The above plant extracts contain plant ingredients such as saponin which is a natural surfactant with cleaning effect foamability. An ideal shampoo must have sufficient viscosity and many natural substance have good viscosity. The gelatin solution exhibited pseudoplasticity and formed a clear solution. Citirc acid added to shampoo act as an antidandruff agent , natural antioxidant and chelating agent and maintains an acidic pH in the formula.

Conclusion:

The main aim of this study was to develop a stable and functionally effective shampoo by excluding all types of synthetic additives usually present in such formulations. Research is needed to replace synthetic ingredients with herbal natural extract that have the same effect to eliminate side effects. Evaluation studies of our shampoo show good cleansing action , better foaming capacity and fast drying time. The formulated shampoo is not only safer than chemical conditoner but also significantly reduce hair loss when used in combination. In the current scenario herbal shampoos despite being stronger and safer than synthetic shampoo seem unlikely to be popular with consumer. It is vital to have a green revolution that is sure to work helping our society survive healthier and longer term. A more radical approach to popularizing herbal shampoos is to change consumer expectations about shampoo emphasizing safety and effectiveness. Formulators must take an active role in educating consumer about the potentially harmful effects of synthetic detergent and other chemical additives in shampoos. There is need to change consumer perception of quality shampoo and the responsibility lies with formulator.

Herbal study instead of synthetic cationic conditioning agents . Several tests were conducted to evaluate the good product shampoos are formulated with aqueous extract of medicinal plant commonly used for hair cleansing . In order to achieve effective conditioning effects shikakai , amla and other plant extract were used in this properties of the prepared shampoos . The result of the evaluation study of the developed shampoo provided a comparable result for quality control testing but its overall quality requires further scientific verification .

From this examination it tends to be reasoned that the antidandruff herbal shampoo formulation possesses all the commendable qualities of the perfect shampoo and is safe , efficient and cost effective . It was viewed as innocuous , more successful and monetary.

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