



Formulation And Evaluation Of Herbal Shampoo

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ABSTRACT

The objective of this study is to formulate and evaluate poly-herbal shampoo for cosmetic purpose from herbal ingredient such as Hibiscus powder, Neem powder, Henna powder, Amla powder, Shikakai powder, Ritha powder, Alo-vera gel was procured from local market in powdered form also gel form Banyan root powder and Soya milk is prepared by homemade method, then prepared decoction of these ingredients and mixing with each other and evaluated for its organoleptic and physio-chemical characteristics. Herbal shampoo is used to cleansing of the hair also conditioning, smoothing, of the hair surface, good health of hair, hair free of dandruff, dirt grease and lice above all, it's safety benefits are expected. The advantage of herbal cosmetics is their non-toxic nature, reduce the allergic reactions and time tested usefulness of many ingredients. Thus in present work, we found good properties for the herbal shampoo and further optimization study benefits of herbal shampoo on human use as cosmetic product.

The aimed to formulate and evaluate herbal shampoo because synthetic may causes the adverse effect on hair and scalp. The herbal shampoo was formulated by Amla powder, Shikakai powder, Ritha powder also addition of preservative agent. Citric acid used as viscosity modifier and pH adjusting agent and glycerin used as conditioning agent. HPMC (hydroxyl propyl methyl cellulose) used as thickening agent. The formulation at laboratory scale was done and evaluated for number of parameters such as pH, foam formation, viscosity, conditioning and wet ability were evaluated, and also to ensure its safety and efficacy.

Keywords: Cosmetic, Herbal shampoo.

INTRODUCTION :-

Cosmeceuticals is the fastest growing segment of the personal care products, these are cosmetic products which contain biologically active principles or ingredients of plant origin There is an increased demand for the use of natural substances in cosmetics in recent years due to their mild action and non-toxic in nature, in many cases they are found to be quite effective.

To study the functions and efficacy of plant derived ingredients for their use in cosmetics, a new branch of science is developed known as "Cosmetic Phytognosy" which deals with biochemical and physicochemical properties of plant derived ingredients to be used in cosmetics. Basically six different types of plant derived ingredients are used in herbal cosmetics which are as follows.

- 1) Fresh materials.
- 2) Dried materials.
- 3) Acellular products (oils, resins, gums).
- 4) Galenical preparations (infusions, decoctions, extracts).
- 5) Processed extracts.
- 6) Pure isolated compounds.

Cosmetic substances help in improving or changing the outward show of the body and also mask the odour of the body. It protects the skin and keeps it in good condition. In general, cosmetics are external preparations which are applied on the external parts the body. Cosmetics include skin care creams, lotions, powders, perfumes, lipsticks, fingernail and toe nail polish, eye and facial makeup, permanent waves, coloured contact lenses, hair colours, hair sprays and gels deodorants, hand sanitizer, baby products, bath oils, bubble baths, bath salts, butters and many other types of products. A subset of cosmetics is called "make-up" which refers mainly to coloured products intended to change the user's appearance. Some products meet the definitions of both cosmetics and drugs. This may happen when a product has two intended uses. For example, a shampoo is a cosmetic because its intended use is to cleanse the hair. An antidandruff treatment is a drug because its intended use is to treat dandruff consequently, an antidandruff shampoo is both a cosmetic and a drug, among other cosmetic/drug combinations are toothpastes that contain fluoride, deodorants that are also antiperspirants, and moisturizers and makeup marketed with sun-protection claims. Such products must comply with the requirements for both cosmetics and drugs.

Hair cosmetics includes various hair cares such as Detergents, Conditioners, Nourishments, Hair colourant, Hair growth promoters, Anti Dandruff.

1.1. Hairs :-

Hair is a complex structure composed by many components that act as a unit, with the biological purpose of protecting the scalp, as well as physical attractiveness to the self-perception of beauty. Nowadays, hair care and style play a very important role in people's lives, both for men and women, so knowledge of hair products, mode of action, efficacy, ingredients and hair procedures has become more relevant in dermatologists' medical practice. The amount of money spent to enhance the hair beauty is an indication of how much attention is given today to the hair appearance. On other hand, these data are emphasized in patients suffering from hair disease.³ Hair care products are used for maintaining cleanliness of the scalp and giving proper moisturization to hair. Hair cares the products also help control the structure and behaviour of the hair so that it is kept in a controlled environment as well in a desirable way. Hair has simple structure made of root and shaft and is made of tough protein called keratin. This keratin decides the strength of hair.

1.2. Structure of hair fiber:-

The hair fiber, about 50-100 μ m in diameter, has both protective and cosmetic function. Hair protect the scalp from sunburn and mechanical abrasion, provide thermoregulation and social communication. The human hair scalp, eyebrows, and lashes are long, thick and pigmented terminal hair fibers. However, the body is covered with hairs of 2-4 cm in length, under 40 μ m in diameter, and often unpigmented, named vellus hairs. Human hair fibres are divided into three main morphological constituents, also composed of the hair follicle: cuticle, cortex and in some cases medulla.

1.2.2. Cortex :-

The cuticle encircles the cortex, the major part of the hair mass. The cortex is composed of cortical cells and the cellular membrane complex. The elongated cortical cells enclosed melanosomes containing melanin (brown/ black pigment) and/or pheomelanin (red pigment), responsible for the hair colour. These cells are tightly packed and contain macrofibrils which are parallel and longitudinal oriented to the hair fibre axis. Each macrofibril is arranged in a spiral formation and comprises intermediate filaments proteins, also called microfibrils, and keratin associated protein, also known as matrix proteins.

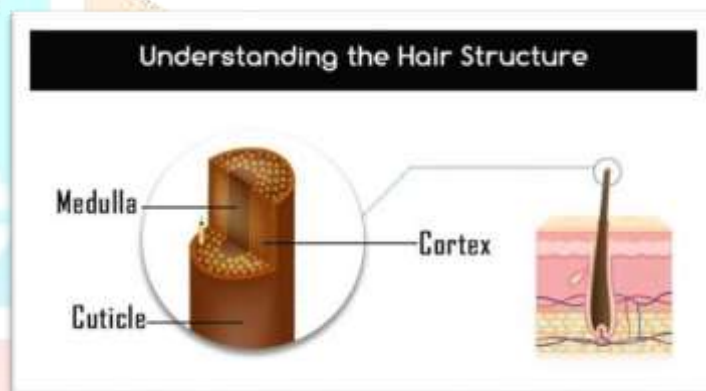


Fig.no1

1.3. Shampoo :-

Shampoos are products designed to cleanse, condition, and provide a pleasant fresh, clean residual scent to hair. Conditioning shampoos are formulated to provide the dual benefit of a shampoo as well as conditioner. It is a sophisticated hair care product, which has a shampoo and conditioner in one. In other words, a single product can be rather than using separate shampoo and conditioner Shampoo is a hair care product used for the removal of oils, dirt, skin particles, dandruff, environmental pollutants and other contaminant particles that gradually build up in hair. The goal is to remove the unwanted build-up without stripping out so much sebum as to make hair unmanageable. Nowadays conditioning shampoos are formulated by experts with a perfect balance of chemicals and natural ingredients like henna, green almonds and shikakai. Unlike other shampoos, conditioning shampoos are mild on hair, and leave it soft, silky and radiant, with the gentle and caring touch of nature. Along with gentle cleaning of hair to remove dirt, conditioning shampoos condition the hair to keep it shiny and flexible. Conditioning shampoos have proved to be extremely good for dry hair as they add to the natural oil supply and gives dry hair, shine as well as strength. Shampoos contain molecules with both lipophilic and hydrophilic sites. The lipophilic sites bind to sebum and oil soluble dirt and the hydrophilic sites bind to water, permitting removal of the sebum with water rinses. There are four basic categories of shampoo detergents: anionics, cationics, amphoteric, and non-ionics. A typical shampoo will typically have two detergents. Anionic detergents have a negatively charged hydrophilic polar group and are quite good at removing sebum; however, they tend to leave hair rough, dull, and subject to static electricity. In contrast, amphoteric detergents contain both an anionic and a cationic group allowing them to work as

cationic detergents low pH and as anionic detergents at high pH. Amphoteric detergents are commonly found in baby shampoos and in shampoos designed for hair that is fine or chemically treated.

Properties of hair shampoo :-

- It should have optimum viscosity such that it facilitates ease during application.
- It should have good spreading properties.
- It should produce sufficient lather after application. .
- It should not form any kind of film on scalp.
- It should rinse out completely after washing.
- It should produce lather with both hot and cold water.
- It should facilitate ease of combing after shampooing.
- After drying, the hair should not give rough appearance.
- It should provide lustre to the hair.
- It should produce good odour both before and after shampooing.

1.4. Herbs used in hair care :-

1.4.1. Amla :-

Amla is one of the most often used herbs in Indian Ayurveda. It has a reputation as a powerful venating herb. The Amla fruit is reputed to have the highest content of vitamin C. Amla having scientific name *Embilica Officinalis* belonging to family *Phyllanthaceae / Euphorbiaceae*.

• Features :-

The tree is small to medium in size, reaching 1-8 m (3 ft 3 in-26 ft 3 in) in height. The branchlets are not glabrous or finely pubescent, 10-20 cm (3.9-7.9 in) long, usually deciduous; the leaves are simple, sub sessile and closely set along branchlets, light green, resembling pinnate leaves. The flowers are greenish-yellow. The fruit is nearly spherical, light greenish yellow, quite smooth and hard on appearance, with six vertical stripes or furrows.

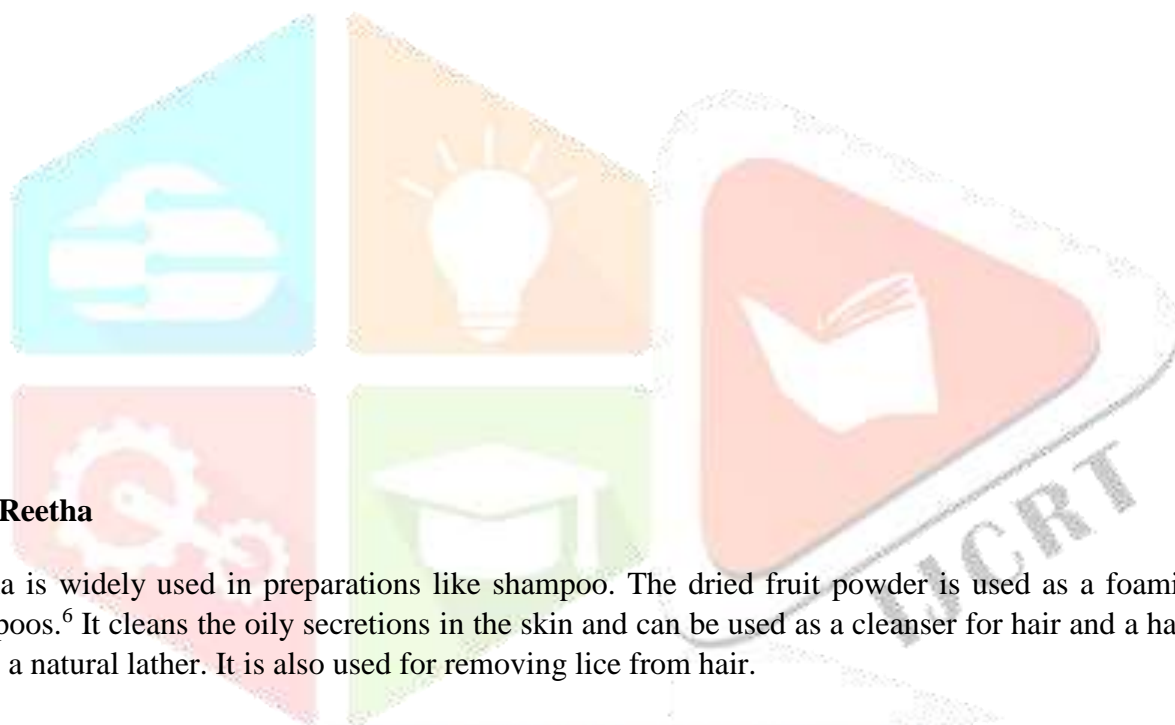
• Uses :-

Hair growth :- The phytonutrients, vitamins and minerals present in amla help in increasing the scalp circulation and stimulate healthy growth. Vitamin C of amla produces collagen protein. This helps in stimulating hair growth, both length and volume wise. Collagens replace the dead cells of hair follicles with new hair cells.

Serves as a natural hair conditioner :- Amla can nourish, strengthen and condition your hair thereby making it shiny and adding volume to your hair. One amla contains up to 81.2 percent of moisture content in it. Those with dry hair, now know what to do. Moreover, if have oily hair, then use amla powder, it will soak in all the excess oil present on scalp, along with conditioning it.

- Treats dandruff :- Dandruff is usually the result of dryness. This vitamin C rich juice cures the dryness and prevents the accumulation of dandruff. Amla Vitamin C, its anti-inflammatory plus its anti-bacterial properties can stop dandruff and also the itching caused by it, on the scalp.
- Improves pigmentation :-Most of the hair colouring packs contain amla in them as it helps in fighting pigmentation. It also helps in discoloration making the hair long and luscious. Moreover, it is important to keep our hair and scalp clean to avoid pigmentation. Amla and its antimicrobial properties, will not just banish hair odour but it will also remove the germs sticking on hair.

Fig.no2



1.4.2 Reetha

Reetha is widely used in preparations like shampoo. The dried fruit powder is used as a foaming agent in shampoos.⁶ It cleans the oily secretions in the skin and can be used as a cleanser for hair and a hair tonic as it forms a natural lather. It is also used for removing lice from hair.



Fig.no3

• **Features Uses** An attractive medium sized deciduous tree, Reetha (*Sapindus mukorossi*), stands up to 20 m in height, with graysmooth bark and pinnate leaves. The tree bears leaves in 5-10 pairs, with large drupes.

1 The dried fruit powder can be used as a foaming agent.

2 It is the ingredient of many Ayurvedic shampoos and cleansers.

3 The seeds of Reetha can be used as a cleanser for washing hair. It forms rich and natural lather. 4 Reethacan remove the oils from the scalp generated by oily secretions.

5 Reetha helps control hair fall by removing dandruff from the scalp. According to Ayurveda, dandruff is the prime cause of hair fall. It is a condition marked by flakes of dry skin on the scalp.

2. LITERATURE REVIEW :-

• Balaji S. Mirkale el. Al. [August 2021] in their review article “Review on hair care products and its evaluation” have reviews on make-up and operating mode of hair cosmetics: shampoos, conditioners, hair straightening products, hair dye.

• Vito Rizzi el. Al. [February 2019] in their review article “Hair care cosmetics: from traditional shampoo to solid clay and herbal shampoo, A Review” have focused on the use of herbs as washing bases alternative to the traditional ones, consisting of a combination of synthetic surfactants, together with other usual ingredients expected in a shampoo formulation.

• Pawan Maurya el.al. [May 2021] in their review article on topic “A review article on : herbal shampoo” have highlighted to prepare and evaluate an herbal shampoo and determine physiochemical function that emphasizes on safety, efficacy and quality of the product Herbal shampoo is the natural hair care product which is use to remove grease, dirt, dandruff and promote hair growth, strengthens and darkness of the hair.

• Ashwini S. Pundkar el. Al. [April 2020] in their research article on topic “Formulation & evaluation of herbal liquid shampoo” have investigated to eliminate harmful synthetic ingredient from herbal shampoo formulation and substitute them with a safe natural ingredient.

• Suyog Sunil Bhagwat el. Al. [September 2020] in their research work on topic “ Formulation and evaluation of herbal shampoo” they have highlighted that herbal shampoo was formulated containing suitable ingredient such as Hibiscus rosa-sinensis, Emblica Officinalis, Acacia concinna, Sapindusindica, Ecliptaprostrata, Aloe barbadensis, and Cassia auriculata in different proportions to formulate and evaluate its physicochemical properties.

• Shah A. Khan el. Al. [December 2014] in their study on topic “Formulation, evaluation and comparison of the herbal shampoo with the commercial shampoos” have highlighted that the formulation and evaluationof herbal shampoo.

Vinayak M. Chavan el. Al. [September 2019] in their research article on topic Formulation and Evaluation of Herbal Shampoo" have highlighted formulation and evaluation of herbal shampoo because synthetic may causes the adverse effect on hair and scalp. The herbal shampoo was formulated by extracting murrayakoenigi, sapindusmukorossias foaming agent, also addition of preservative agent. Citric acid used as viscosity modifier and pH adjusting agent and glycerine used as conditioning agent.

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3. OBJECTIVES AND NEED OF STUDY :-

- The objective of the present work is to study various hair care products and to develop herbal shampoo by using various herbs. The prepared shampoo is evaluated on different parameters. The present work is also aim to compare prepared herbal shampoo with other marketed product.

4. PLAN OF WORK :-

1. Selection and procurement of plant materials.
2. Literature review.
3. Study of various hair care products
4. Formulation of herbal shampoo.
5. Evaluation of herbal shampoo.
6. Comparison of formulated shampoo with other marketed shampoo.
7. Compilation of data.

5. MATERIALS AND EQUIPMENTS :-

5.1. Materials :-

- Ritha powder
- Amla powder
- Shikakai powder
- Methyl paraben
- Gelatine
- Citric acid • Rose oil
- All required plant materials were procured from local market from "Patanjali Store" Devgaorangari.

5.2. Equipment and Apparatus :-

- Beaker
- Measuring cylinder
- Water bath
- Test tubes
- Test tube stand
- Mortar and pestle
- Porcelain dish

6. STUDY OF VARIOUS HAIR CARE PRODUCTS :-

Hair Care Products means products that either

- (a) have the primary purpose of cleaning human scalp and/or facial hair through the application of a composition with anionic, non-ionic or zwitter ionic surfactants, including hair shampoo;
- (b) have the primary purpose of cleaning or balancing human scalp and/or facial hair through the application of a composition that does not contain surfactants;
- (c) have the primary purpose of providing lubricity and protection to human scalp and/or facial hair cuticles through the application of either a rinse-off or leave-on composition containing cationic surfactants, waxes, long-chain fatty alcohols, silicones or oils, including shaving cream; or (d) have the primary purpose of stimulating human hair growth. Various hair care products are available in the market i.e., Shampoo, hair conditioner, hair oils, etc.

6.1. Hair conditioner :-

Conditioners fulfil the need for hair shaft protection and are agents either incorporated into shampoo or used after cleansing, on slightly damp hair. After a shampoo wash, the cuticles get slightly lifted, and the hair develops a negative charge causing the hair to repel each other and appear rough and uncombed. Conditioners flatten the cuticles and seal the gaps that could expose the important cortex to environmental damage. Conditioning agents incorporated into shampoos include mineral oils, vegetable oils, fatty alcohols/esters, humectants, hydrolysed animal proteins, glycerine and natural products like bees honey, vinegar, wheat germ oil, collagen.

Ideal properties of hair conditioner :- •It should provide shine and smoothness.

- It should protect hairs from mechanical and chemical trauma.
- It should reduce split ends.

- It should improve manageability. **6.2. Hair oils :-**

Hair oils are the hair care preparations used for the prevention and treatment of baldness and other ailments. They also promote the luxurious growth of hairs. Hair oil containing herbal drugs are used as hair tonic. Hair tonics and hair grooming aids are basically the extract of medicinal plants in an oil base. Good hair oil should stimulate hair growth, combat dry scalp and dandruff, remedy damage, add lustre, and nourish hair. Various types of oils like coconut oil, mustered oil, castor oil, olive oil is applied to scalp in a mixture with suitable herbal drugs.

Ideal properties of hair oils :-

- It should prevent premature greying of hairs.
- It should reduce hair fall.
- It should improve dry scalp condition.
- It should strengthen hair at the root.
- It should promote hair growth.

6.3. Hair dyes :-

Hair colorants/ dyes are the cosmetic preparations which are used by men and women either to change the natural hair or to mask grey hair. Hair beauty cosmetics are those that change hair colour or shape. They include temporary setting products (such as hair spray, foam, or hair gel), permanent waving or straightening products, and hair dyes.

Hair dyes colour hair temporarily or permanently by removing part of the existing pigment and /or adding new pigment. Dyes are used by both men and women to alter natural hair colour, postpone greying of hair, or restore pigmentation once greying has set in. In developed countries, 70 % of women dye their hair at least once, and many do so regularly. Hair dyes are cosmetic used to change hair colour. They require regular application to mask new hair growth.

Ideal properties of hair dye :-

- The formulation of hair dyes should be stable.
- They should colour the hair evenly
- They should not lead to loss of the natural shine of hair.
- They must possess properties like non-irritant and non-sensitizing.
- The coloured hair must be unaffected by air, water, sunlight, sweat, friction, shampoo, etc.

6.4. Hair shampoo :-

A viscous cosmetic preparation with synthetic detergent used for washing hair is called shampoo. Its principal is to clean the scalp such that it should become free from sebum and foreign substances, shampoo also make the hair lustrous and good looking. Apart from cleaning, shampoo may also be used for medicinal purpose (i.e. medicated shampoo). Shampoo is a basic hair care product representing the largest segment of hair care cosmetics. Shampoo is typically in the form of a viscous liquid with some exception of waterless solid form such as a bar. Shampoo is a hair care product used for the removal of oils, impurities, skin particles, dandruff, natural impurities and other pollutants that form slowly in the hair.

Ideal properties of hair shampoo :-

- It should have optimum viscosity such that it facilitates ease during application.
- It should have good spreading properties.
- It should produce sufficient lather after application.
- It should be able to remove waste material such as debris, soil, sebum, dead cells, salts (due to sweat) etc., from the scalp.
- It should not form any kind of film on scalp.

Ingredient role :- A) Conditioning agents

:-

These are used in lubricating the hair and improve the texture of the hair. It reduces the fringes and smoothen the hair shafts. It makes the hair soft and shiny. Lanoline and its derivatives, glycerine and propylene glycol are used as hair conditioners.

B) Thickening agents :-

These are used to increase the viscosity of shampoos and provide the desired consistency to the preparation.

Polyvinyl alcohol, methyl cellulose, sodium alginate and sodium stearate are used as thickening agent.

C) Solubilizing agents :-

These are used to solubilize poorly soluble substances so as to get a clear shampoo, ethyl alcohol, glycerol, propylene glycol and diethylene glycol, mono ethyl ether are commonly used as solubilizing agents.

D) Opacifying agents :-

These are used to make the shampoo opaque. Glycol, glycerol stearate, cetyl alcohol and stearyl alcohol, stearic amides are some of the commonly used opacifying agents.

E) Preservatives :-

These are required to preserve the shampoos against bacteria or mould contamination by adding preservatives. Methyl paraben and propyl paraben are commonly used preservatives in shampoos.

F) Perfumes :-

Perfumes are also incorporated to have an after use fragrance on the hair. They also help to signed for mask the odour of the other ingredients, particularly detergents. Various perfumes are used for this purpose.

Perfumes are used in 0.3-1.0%.

7. EXPERIMENTAL WORK :-**7.1. Formulation of herbal shampoo :-**

For the formulation of herbal shampoo, we had taken three different beaker and labelled them as 'A', 'B', 'C'. In beaker 'A', 10 gm of Ritha powder was taken and 30 ml of ethyl alcohol was added. These beaker kept at normal temperature and it was prepared by using cold maceration method. In beaker 'B', 10 gm of Amla powder was added and 50 ml of water was added to it and boiled it for 5 minutes. In beaker 'C', 10 ml of Shikakai powder was added and 50 ml of water was added to it and boiled it for 5 minutes. All the extracts of beaker 'A', 'B', 'C' was mixed properly and triturated together. Then 1 ml of methyl paraben and sufficient quantity of gelatine was added to it. The small quantity of Citric acid was added to adjust the pH of shampoo. The Rose oil was added finally before final formulation of herbal shampoo.

Sr. no.	Ingredients	Quantity
1.	Ritha extract	30 ml
2.	Amla extract	50 ml
3.	Shikakai extract	50 ml
4.	Methyl paraben	1 ml
5.	Gelatine solution	Quantity sufficient
6.	Citric acid	Quantity sufficient
7.	Rose oil	0.1 ml

Table 1: Formula for herbal shampoo

Sr. no.	Ingredients	Role of ingredients
1.	Ritha extract	Foaming agent
2.	Amla extract	To provide nourishment to hair
3.	Shikakai extract	Anti-dandruff
4.	Methyl paraben	Preservative
5.	Gelatine solution	Base
6.	Citric acid	To adjust pH
7.	Rose oil	Perfume

Table 2 : Role of Ingredients :-

7.2. Evaluation of herbal shampoo >

7.2.1. Organoleptic characters :

The prepared formulation was determined by its colour and odour

7.2.2. pH determination :

1 gm of shampoo was mixed with 9ml of water. And the pH of herbal shampoo was determined by using pH paper. SA

7.2.3 % solid content :

Cleaned and dried evaporating dish was weighed (A) and 4 grams of shampoo was added to the evaporating dish. The dish and shampoo was weighed (B). The exact weight of the shampoo was determined. The evaporating dish with shampoo was placed on water bath until the liquid portion was evaporated. The weight of the shampoo (solids) after drying was calculated.



Fig.no.4 % Solid content - $\frac{B-A}{\text{Weight of shampoo}} \times 100$

Where, A-Weight of empty porcelain dish.-B-Weight of porcelain dish alter evaporation.

7.2.4. Foaming test :

Cylinder shaken method was used for determining foaming ability 5 ml of shampoo was taken into measuring cylinder and volume was made upto 25 ml and shaken properly for 10 times. Then 5 test tubes were taken and stock solution was taken in proportion 1ml, 2ml, 3 ml, 4ml, 5ml in each test tube and remaining quantity of water was added to adjust the test tube volume upto 10ml. Then height of foam in each test tube was measured in cm and foaming index was calculated.

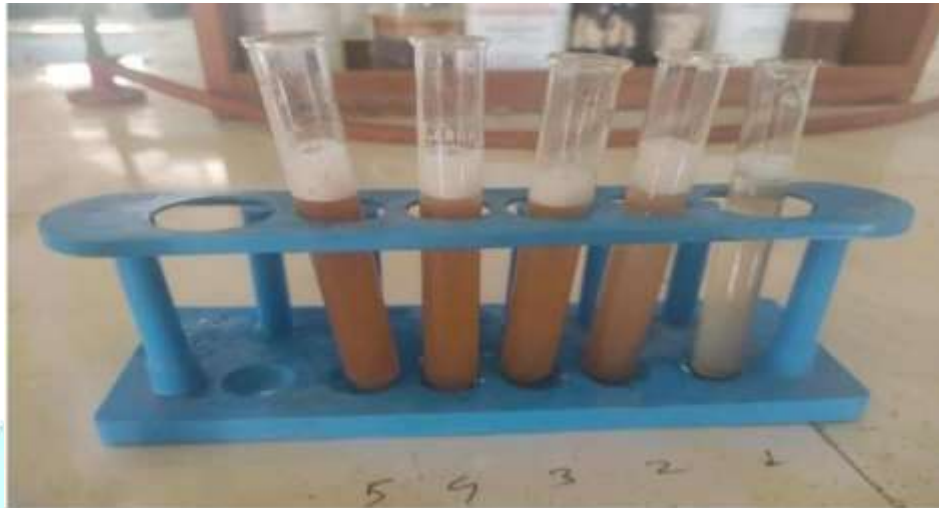


Fig.no.5 Volume of stock solution



Fig.no.6 Foaming index of herbal shampoo

Foaming index = 1000/ A Where, A = Volume of samples have I cm height of foam for prepared formulation
case of marketed preparation, A Volume of sample have 4 cm height of foam for prepared formulation.

7.2.5. Dirt dispersion test :

Two drops of shampoo was added to 10 ml of water containing test tube and one drop of ink was added in test tube. Then the test tube was shaken for 10 times. The amount of ink in the test tube was estimated as none, light, moderate or heavy, indicates the dispersion nature of the shampoo.

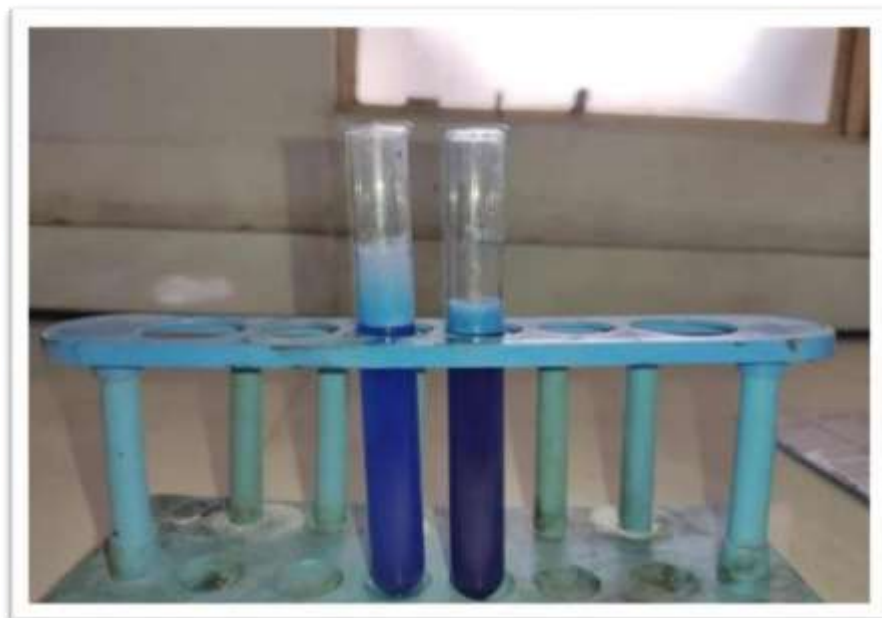


Fig.no.7 Dirt dispersion test of herbal shampoo and marketed shampoo

7.3. Comparative study of prepared formulation of herbal shampoo with marketed shampoo:-



Fig.no.8. Prepared herbal shampoo



Fig.no.9. Indulekha shampoo

The marketed preparation was evaluated by following parameters :-

1. Organoleptic characters
2. pH determination
3. % Solid content
4. Foaming test
5. Dirt dispersion test

8. RESULT AND DISCUSSION :-

8.1. Evaluation of herbal shampoo :-

A. Organoleptic characters :-

- Colour :- The colour of prepared herbal shampoo was found to be Brownish.
- Odour :- The odour of prepared herbal shampoo was found to be Pleasant.

B. pH determination :-

- The pH of herbal shampoo was found to be 6.

C. % Solid content :-

- **% Solid content = $B - A / \text{Weight of shampoo} \times 100$**

- Where, A = Weight of empty porcelain dish

- B = Weight of porcelain dish after evaporation

- Weight of empty porcelain dish (A) = 64.094 gm.

- Weight of porcelain dish after evaporation (B) = 64.551 gm. • Weight of sample = B – A • Weight of sample

$$= 64.551 - 64.094$$

- Total solid content = 0.457 gm.

- Therefore % solid content = $(B - A) / 4 \times 100$

- % solid content = $0.457 / 4 \times 100$

- % solid content = 9.14 %

D. Foaming index :-

Observation of foaming index of herbal shampoo

Sr. no.	No. of test tubes (ml of stock solution)	Height of foam (in cm)
1.	1 ml	0.8 cm
2.	2 ml	1.3 cm
3.	3 ml	1 cm
4.	4 ml	1.5 cm
5.	5 ml	2 cm

Table no. 3 Foaming index = 1000 / A

- Where, A = Volume of samples have 1 cm height of foam for prepared formulation.
- Foaming index = 1000 / 3
- Foaming index = 333.33

E. Dirt dispersion test :-

- The amount of ink in foam was estimated as moderate in colour.

8.2. Evaluation of marketed shampoo :-

A. Organoleptic characters :-

- Colour :- The colour of prepared herbal shampoo was found to be Reddish brown
- Odour :- The odour of prepared herbal shampoo was found to be Pleasant.

B. pH determination :-

- The pH of herbal shampoo was found to be 6.5.

C. % Solid content :-

- Weight of empty porcelain dish (A) = 76.14 gm

- Weight of porcelain dish after evaporation (B) = 76.47 gm
- Weight of sample = B – A
- Weight of sample = 76.47 – 76.14
- Total solid content = 0.33 gm
- Therefore % solid content = $(B - A) / 4 \times 100$
- % solid content = $0.33 / 4 \times 100$
- % solid content = 8.25 %

Sr. no.	No. of test tubes (ml of stock solution)	Height of foam (in cm)
1.	1 ml	3.8 cm
2.	2 ml	4 cm
3.	3 ml	4.7 cm
4.	4 ml	5 cm
5.	5 ml	5.1 cm

D. Foaming index :-

Observation of foaming index of marketed shampoo Table

no. 4 Foaming index = $1000 / A$

- Where, A = Volume of sample have 4 cm height of foam for marketed formulation.
- Foaming index = $1000 / 2$
- Foaming index = 500

E. Dirt dispersion test :-

- The amount of ink in foam was estimated as light in colour.

8.3. Comparison between prepared shampoo with marketed shampoo :-

Comparison between herbal shampoo and marketed shampoo

Sr. no.	Parameters	Prepared herbal shampoo	Marketed shampoo
1.	Colour	Brownish	Reddish brown
2.	Odour	Pleasant	Pleasant
3.	pH value	6	6.5
4.	% Solid content	9.14 %	8.25 %
5.	Foaming index	333.33	500
6.	Dirt dispersion test	Moderate	Light

Table no. 5

8.4. Discussion :-

Shampoo was developed to replace soap for cleansing scalp and hair by removing unwanted sebum, dandruff, environmental dust and residues of hair care products.

Now days, the herbal cosmetic products are mainly preferred over a synthetic cosmetic products due to less side effects.

Herbal shampoo possess desirable physiological activity such as healing, smoothing appearance, enhancing and conditioning properties because of herbal ingredient like Heena, Ritha and Shikakai, etc. It is skin

friendly never cause irritation to the eyes and scalp.

Herbal shampoos also keep the natural colour of our hair and with regular usage, even enhance them.

Along with this, they keep the hair healthy, shiny, bouncy with a well- balanced and healthy scalp.

By studying, benefits of herbal shampoo, we decided to prepare herbal shampoo with ingredients like Heena, Ritha and Shikakai.

We had evaluated this shampoo by using methods like organoleptic characters, PH determination, foaming index, % solid content and dirt dispersion test.

The pH determination test was used to check the skin friendliness nature of herbal shampoo.

Our prepared herbal shampoo shows the desirable pH. Hence it was non-irritant to skin.

The foaming index tested to check cleansing potential of shampoo. Our prepared herbal shampoo passed the

foaming index test and it show the higher cleaning effect.

The herbal shampoo was passed the % solid content and easily rinsed out through hair.

The shampoo showed moderate colour in dirt dispersion test. It had higher cleansing action on dirt.

9. CONCLUSION :-

Herbal shampoo shows less side effects as compared to synthetic shampoo. The prepared herbal shampoo shows optimum result on evaluation test.

The prepared herbal shampoo shows anti dandruff and cleansing properties.

The evaluation result shows that the prepared formulation has standards as per marketed products.

Promising formulation of quality enhance aroma, cleaning ,and foaming ability.

It plays an important role in removal of surface grease and dirt from hair and scalp.

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