FORMULATION AND EVALUATION POLYHERBAL LIQUID SHAMPOO

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ABSTRACT

The study aimed to formulate a laurel herbal shampoo and to evaluate and compare its physicochemical properties with the marketed synthetic and herbal shampoos. The herbal shampoo was formulated by adding the extracts of Acacia concinna, Sapium embelica, and Citrus aurantiifolia in different proportions to a 10% aqueous gelatin solution. Smell & a few drops of ethanol paraben was added as a preservative, and pH was adjusted with citric acid. Several tests such as visual inspection, % of solid contents, foam volume, and stability, surface tension, detergency, dirt removal, etc., were performed to determine the physicochemical properties of the formulated shampoo and marketed shampoo. The formulated herbal shampoo was also evaluated. The formulated herbal shampoo was clear and appealing. It showed good cleansing and deterging properties, low surface tension, small bubble size, and good foam stability after 5 minutes. The prepared shampoo and commercial shampoo showed comparable results in terms of solid contents at 30°C. The score of the conditioning performance, at par with commercially available shampoos. Further research and development is required to improve its quality and safety.

1. INTRODUCTION

Hair or pili are growths of the epidermis which are present over almost the complete body. They're however absent only from the perimeters and palmar surfaces of the hands, sides, and plantar surfaces of the feet, the lips, and also the region round the urogenital orifices. A hair consists of columns of dead and keratinized cells joined together. The shaft is the part of the superficial portion of the hair, which projects from the surfaces of the skin. The shaft of straight hair is round in cross-section, that of wavy hair is oval which of wooly hair is elliptical or kidneyshaped.[2,3]

Figs. - Structure of Hair.

The root is that 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 encompass three concentric layers.

- Medulla: it's the central part of the shaft and is mostly noticeable in thick hairs. It's composed of two or three layers of polyhedral cells containing pigment granules and air spaces.
- Cortex: it's located peripheral to the medulla and forms the key part of the shaft. It entails of elongated cells, encompassing pigment granules in dark hair though air in white hair.
- Cuticle: it's the outermost layer of the hair and consists of one layer of thin, flat cells which are heavily keratinized.

SHAMPOO:

A Shampoo is a preparation of surfactant (i.e. a substance that forms a layer of film on water) which removes surface grease, dirt, and skin debris from the hair shaft and seals with adversely a fleeting the user.[1, 5]

REQUIREMENTS OF A SHAMPOO:

1. It should effectively and completely remove dust and soil, excessive sebum or other fatty substances and loose cornéal cells from the hair.
2. It should produce a good amount of foam to satisfy the psychological requirement of the user.
3. It should be easily removed on rinsing with water.
It should leave the hair non dry, soft, lustrous with good manageability and minimum fly away.

It should impart a pleasant fragrance to the hair.

It should not cause any side effects / irritation to skin or eye.

It should not make the hands rough and chapped.

**WYPESOFSHAMPOO:**

Shampoos are of the following types:

- a) Powder Shampoo
- b) Liquid Shampoo (Lotion Shampoo)
- c) Cream Shampoo
- d) Jelly Shampoo
- e) Aerosol Shampoo
- f) Specialized Shampoo
- g) Conditioner
- h) Anti-dandruff Shampoo
- i) Baby Shampoo

**HERBAL SHAMPOO**

Shampoos are probably the most widely used cosmetic products for cleansing hairs and scalp in our daily life[1]. Herbal shampoos are the cosmetic preparations that use herbs from plants as an alternative to the synthetic shampoo available in the market. The herbal shampoo is important as people nowadays prefer herbal products than chemical ones for they proved to enhance health. The awareness and need for cosmetics with herbs are on the rise, primarily because it is believed that these products are safe and free from side effects [2]. Herbal Shampoo is a widely daily unstable product all over the world. It has been used from many years. Today’s market is filled with a chemical Herbal Shampoo [3]. Chemical HS prepared with several chemicals which can cure hair problem but also responsible for damage of hair. Some international research said that the chemicals of Herbal Shampoo are also responsible for cancer [4]. Herbal Shampoo is defined as a preparation of a surfactant (surface active material) in suitable form liquid solid or power which when used under the conditions specific it will remove surface grease, dirt and skin debris from the hair shaft and scalp without affecting adversely the hair, scalp or health of the user. Herbal Shampoo has so many types as powder, liquid, lotoon, cream, jelly, aerosol, specialized Herbal Shampoo (Conditioning, Anti-dandruff, Baby, Two Layers). But the future of HS is going to be herbal Shampoo [5]. It contains all the natural ingredients with herb encracy.

**NEED OF SHAMPOO:**

The skin on our head produce a greasy fluid called sebum. It is produced to protect the hair by coating itself all over the head. This give the hair a healthy shine but when secretes in large amount it makes the hair look dirty. [2, S] without enoinszis or nanaa sxrixroo:

- a. It should effectively and completely remove dust or soil, excessive sebum or other fatty substances and loose corneal cells from the hair.
- b. It should produce a good amount of foam to satisfy the psychological requirement of user.
- c. It should be easily removed on rinsing with water.
- d. It should leave the hair non-dry, soft, lustrous with good manageability and minimum fly away.
- e. It should impart a pleasant fragrance to the hair.
- f. It should not cause any side-ejects / irritation to skin or eye.
- g. It should not make the hand rough and chapped.

**Advantages**

1. Pure and organic ingredients.
2. Free from side effects.
3. No surfactant eg SLS.
4. No animal testing.
5. No petroleum based ingredients.

**LIMITATIONS:**

1. Some herbs are to scalp. EX. Lemon, Menthol, Peppermint and papaya etc.
3. Seasonal variation of plant constituents.
4. Less stable so, preservative should be added.
5. Vary is consistency from batch to batch.

DESIRE PROPERTIES OF SHAMPOO:
1. Ease application.
2. Removal of Debris.
3. Ease wet combing. F \textsuperscript{88}\textsuperscript{•}ncc.
4. Low level of irritation.
5. Well preserved.
6. Good stabilty.
7. Good stabilty.

FUNCTION OF INGREDIENTS
1. Amla:- It nourishes hair and help for growth. It allowing the nature texture and nature oils of the hair retained for a healthy shine and appearance. It controls hair loss. It contain fatty acids that moisture the hair. Fatty acids penetrate through the scalp to remove dryness and dandruf. It contain antioxidant properties which strengthening the roots of the hairs. It acts as a conditioner that gives hair a nature shine and bounce. 2,3,4]

2. Retha:- It is a cleansing agent, kep scalp gentle and removes any microorganism responsible for infection. Itnourisheshair,kephealthyandsmoothalso. Itisalsohelpful for dandruff.

3. Shika kai :- It retain nature oil of hair, It kee ps hair Lustrous and healthy. It condition and strenght the hair. It reduce hair loss and a dds volume to he hair. It producescapfromin+ebon.
4. Lemanjuice:- Itm a intainsthepHofHS. ItgivesafragrancetoHS. Antimicrobialagent.

FUNCTION OF CHEMICALS
1. Methvl Paraben :They acts as a preservative that prevents the growth of bacteria, fungi and Moulds in shampoo.
2. Gelatin Solution:As an vehicle.
3. Essential Dil(ROSE Oil):It is use for shiny and scented hair.
   i. \& Citric Acid :To Adjust the pH of the shampoo

3. AIM AND OBJECTIVES

AIM :Preparation and evaluation of Herbal Powder Shampoo.

OBJECTIVES: As we know that now a days synthetic shampoos are very harmful for the hairs wh ich can cause the damage, hair fall, dandruff in the hairs. Hence our motive to formulate the herbal shampoo is that the natural ingi edients like Henna, Reetlia, Shikakai, Hibiscus etc. are used for the best result on hair treatment.[2]

• Prevent hair fall.
• Anti-dandruff property.
• Promote hair growth.
• Anti-microbial agent.

The plan of work as follows :
1) Literature Surveys, Front Books, Internet, National & International Journals, and e-resources.
2) Procurement / collection of herbal extract.
3) Procurement / collection of selected drug, sample f'rom pharmaceutical industries.
4) i dentification test of drug sample.
5) Preparation test extract from herbal plant.
6) Preparation uf herbal shampoo.
7) Evaluation of prepared shampoo.
3. PLANT PROFILE

1. REETHA:

Synonym- Reetha, Soapnut, Washnut, Aritha.

Biological Source- It is dried fruits of species of Sapindus Muknrossi belong to family Sapindaceae.

Organoleptic Properties- Color-Dark brown to Black Odour-Characteristics Taste-Bitter

Chemical Constituents- The main constituent of reetha is Saponins. Other constituent are, Sopindic acid, Oleanolic acid, Sapindoside A&B, Mukuroziosides, Trifoliosid.

Uses-

Reetha is employed because the main ingredient in soaps and shampoos for laundry hair, because it is taken into account good for the health of hair.

Reetha is additionally used for removing lice from the scalp, because it has gentle insecticide properties.[Z,4,5]

It is employed as a cleanser, surfactant. In addition, it's used for the treatment of eczema, psoriasis, and for removing freckles.

The plant is thought for its antimicrobial properties.

2) AMLA:

Synonym : AmJang (Ar ), Amlaki (B.),Amhala (€.), Amalica (H.), A nut a (Or.). Biological Source: This is consist of dried, as well as fresh fruits pericarp of the plant Emblica officinalis Gaerth Phyllanthus emblica Linn. Belonging to family Euphobiaceae. It contains not less than 1.0% w/w of Gallic acid calculated on dry basis.

Organoleptic Properties:

Colour: The green colour changes to light yellow or brick real in matuity.

Odour: Odourless.

Chemical Constituents: Emblicanin A and B, Piinigluconin, Pedunculagin, Chebulinic acid (Ellagitannin), Phyllantine, Gallic acid Proliiiie, A1anine, Pectine, Ascoi bic acid, titric acid.

Uses:

Fresh amla: These are available in season in Indian stores. You can eat amla slices raw with salt and spices, like in India or you can mix a teaspoon of honey. Honey balance the tart taste of amla.

Amla oil: This oil helps to strengthen the hair, prevents premature praying and stop hair fall.
3. Shikakai

Synonym: Satala, Virala, Tatphala.

**Biological Source:** Dried fruits of Acacia Concinna belonging to family Fabiaceae. Organoleptic Properties: Color-Dark brown. Odour-Characteristics.

**Chemical Constituents:** The chemical constituents of shikakai are, Stobestci ol, Acacia acid, Lactone, Glucose, Arabinose.

**Uses:**
- Shikakai gives healthy, beautiful and bouncy hair causes you to look beautiful,
- It is rich in antiophthalmic factor, D, E and K and other antioxidants which very essential for healthy and quick growth or hair naturally.

Shikakai is employed in many shampoos and hair medicines for its hair strengthening and conditioning properties.

4) HENNA:

**Synonym:** Egyptian Privet Lawsonia Alba.

**Biological Source:** It is a fresh or dried leaves or Lawsonia Inermis belonging to family Lythraceae.

It is biennial dicotyledonous herbaceous shrub. A native of North Africa and South-West Asia, the plant is now widely cultivated throughout the tropics as an ornamental and dye plant.

**Organoleptic Properties:** Color-Greenish brown Odour-Characteristics Taste-8itter

**Chemical Constituents:** The main constituent of henna is l.awson(0.5- 1.00) .

Other constituents are- Gallic Acid, White Resin, Sugars, Tannins, Xanthenc, Pinens, Glycoside- Hemoside(A, B and C).

**Uses:**
Henna conditions your hair-Henna is a keep conditioner that leaves your hair feeling 3b5clutCTy gorgeous.
Nenna prevents dandi uff-Using Henna regularly on your hair cures dandruff and prevents it from coming back.
Henna repairs splits ends- Dry and damaged hair is prone to split ends, which worsen the situation.
Henna bi’eaks th is viscous cycle and gives you deeply conditioned and nourished hair.

**BHRINGRAJ OIL:**

**Synonym:** Verbesina prostrata L., E clipta undulate W illd, Eclipta patula Schrad.ex DC.

**Biological Source:** Eclipta alba family Compositae.

**Organoleptic Properties:** Colour: Light Green Odour: Pungent.
Chemical Constituents: Flavonoids & Isoflavonoids- Wedelolactone, Triterpene glycosides.

Uses:

1. Nutritient to the Hair.
2. Helps to Treat Scalp Folliculitis.
3. Early Graying of Hair.
4. Useful to Treat Dandruff. [2,4,5,6]

MATERIAL AND METHODS
FORMULA: PREPARATION OF HERBAL SHAMPOO

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Ingredients</th>
<th>Quantity Given (for 100gm)</th>
<th>Quantity Taken (for 1 Ogrn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reetha Extract</td>
<td>1%</td>
<td>10gm</td>
</tr>
<tr>
<td>2</td>
<td>A ml a Extract</td>
<td>1/0</td>
<td>10gm</td>
</tr>
<tr>
<td>3</td>
<td>Shikakakai extract</td>
<td>1 %</td>
<td>10gm</td>
</tr>
<tr>
<td>4</td>
<td>Henna extract</td>
<td>TO</td>
<td>10 gin</td>
</tr>
<tr>
<td>5</td>
<td>Methyl Paraben</td>
<td>1ml</td>
<td>0.mL</td>
</tr>
<tr>
<td>6</td>
<td>Gelatin Solution</td>
<td>0.5(q.s)</td>
<td>0.s</td>
</tr>
<tr>
<td>7</td>
<td>Citric Acid</td>
<td>1%</td>
<td>q.s</td>
</tr>
<tr>
<td>8</td>
<td>Bhringraj Oil(Flower)</td>
<td>0.1 ml</td>
<td>0.01ml</td>
</tr>
<tr>
<td>9</td>
<td>Lemon juice</td>
<td>q.s</td>
<td>lml (q.s)</td>
</tr>
<tr>
<td>10</td>
<td>Distilled Water</td>
<td>q.s</td>
<td>qs</td>
</tr>
</tbody>
</table>

ROLE OF INGREDIENTS:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>INGREDIENTS</th>
<th>CATEGORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reetha Extract</td>
<td>Foaming Agent</td>
</tr>
<tr>
<td>2</td>
<td>A ml a Extract</td>
<td>Promote Hair Growth</td>
</tr>
<tr>
<td>3</td>
<td>Shikakakai Extract</td>
<td>Detergent</td>
</tr>
<tr>
<td>4</td>
<td>Henna Extract</td>
<td>Anti- Dandruff</td>
</tr>
<tr>
<td>5</td>
<td>Methyl paraben</td>
<td>Preservative</td>
</tr>
<tr>
<td>6</td>
<td>Gelatin Solution</td>
<td>Base</td>
</tr>
<tr>
<td>7</td>
<td>Citric Acid</td>
<td>To adjust the pH</td>
</tr>
<tr>
<td>8</td>
<td>Bhringraj oil</td>
<td>Fi agrance</td>
</tr>
</tbody>
</table>

TABLE NO.2 ROLE OF INGREDIENTS.
5. METHODS
Different parts of plants were selected to study hair care property.

Sample collection: *Eclipta Prostrata* (Bhringraj oil), *Lawsonia Inermis* (Henna) *Vdus Mukorossi* (reetha), *Acacia concina* (shikkaai), *Plyilto athus* emu/ten (a ml a) were collected in dried form from Shrii ampur marvet (2,3,4,5).

PREPARATION OF PLANT EXTRACT:
- *Reetha* Extract:
  - 10 gm of Reetla a powder in 70” u ethyl alcohол.
- *Amla* Extract:
  - 10 gm of Amla powdcr in 50 ml water and boil.
- *Shikakai* Extract:
  - 10 gm of Shilikakai powder boiled in 50 mil water.
- *Henna* Extract:
  - 4 0 gm of Henna powder in S Oml water.
- *Gelatin Solution*:
  - Ooil S 0 ml of vrater and add 1 gm Gelatin powder and again boil for 4 min.
  - Then mix all the extracts and tritiirated together .[5,6]

6. EXPERIMENTAL WORK:

PROCEDURE:

The plant extracts were mixed in different proportion toobtaina shampoo.

Herbal extract swere added to10OZogelatin solution and were mixed by .shaking for 20 min. Lemon juice(t mL)and Methyl Paraben were also added with stirring.

Firially the pH of the solution was adjusted by adding sufficient quantity cif 1% citric acid solution.
Few drops of rose nil & Bhringraj oil were also added to impart aroma to the prepared shampoo and the final volume was made to 50 mL with gelatin solution.[12,13,14,15]

![Fig.09, pH Determination](image)

**EVALUATION PARAMETER OF FORMULATED SHAMPOO**

**Organoleptic Characters:**
- Colour: Brownish.
- Odour: Pleasant.

**pH Determination:**

pH of formulation was determined by using pH meter and neutral pH was obtained by adding citric acid solution.

**Foaming Index:**

Cylinder shake method was used for determining foaming ability. 5 mL of shampoo was taken into measuring cylinder and volume was made up to 50 mL and shaken properly for ten times. Then 5 test tubes were taken and stoke solution was adjusted for volume up to 10 mL by adding water. Then foam in each test was measured in cm and foaming index was calculated (8.9, icy).
% Solid Content:

A clean dry evaporating dish was weighed and added 4gm of shampoo to evaporating dish. Then dish was allowed to evaporate the shampoo on hot plate. Weight of evaporating dish after evaporation of shampoo was noted and calculation.\textsuperscript{i,12,13}

Dirt Dispersion Test:

Two drops of shampoo was added to 10 ml of water containing test tube and one drop of link was added in test tube. Shake test tube for 10 times. The amount of ink in foam was estimated as None, Light, Moderate or Heavy, indicates the dispersion nature of shampoo. \textsuperscript{i4,ii,i2}

Fig.13.Dirt Dispersion Test.
OBSERVATIONS TABLES AND CALCULATION

1. Foam Index:
   a) Observation Table:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>No. of test tubes containing ml of stock solution</th>
<th>Height of foam in cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1mL</td>
<td>0.9cm</td>
</tr>
<tr>
<td>2</td>
<td>2mL</td>
<td>1.7cm</td>
</tr>
<tr>
<td>3</td>
<td>3mL</td>
<td>2cm</td>
</tr>
<tr>
<td>4</td>
<td>4mL</td>
<td>2cm</td>
</tr>
<tr>
<td>5</td>
<td>5mL</td>
<td>2.7cm</td>
</tr>
</tbody>
</table>

   Table NO.4 Observation Of Foam Index.

2. % Solid Content:
   Calculation:
   1) Weight of empty evaporating fish (A) = 76.14 gm.
   2) Weight of evaporating dish after evaporating (B) = 76.47 gitt.
   3) Weight of Sample = (B) — (A)
      = 76.47 — 76.14
      Total solid content = 0.33 gm.
      Therefore, % solid content = (B - A)/4 x 100
      = 0.33/4 x 100
      = 8.25%.

3. Dirt Dispersion Test = Light in colour.

RESULT AND DISCUSSION
A Herbal Shampoo was formulated and evaluated.

<table>
<thead>
<tr>
<th>SR.ND</th>
<th>Parameters</th>
<th>Fi</th>
<th>Fz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Physical appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colour</td>
<td>Brownish</td>
<td>brownish</td>
</tr>
<tr>
<td>2</td>
<td>Odour</td>
<td>Pleasant</td>
<td>Pleasant</td>
</tr>
<tr>
<td>3</td>
<td>Appearance</td>
<td>Turbid</td>
<td>Turbid</td>
</tr>
<tr>
<td>4</td>
<td>Dirt Dispersion</td>
<td>Morlerate</td>
<td>Light</td>
</tr>
<tr>
<td>5</td>
<td>Wetting Test</td>
<td>37sec</td>
<td>56scc</td>
</tr>
<tr>
<td>6</td>
<td>Foam Index</td>
<td>490</td>
<td>500</td>
</tr>
<tr>
<td>7</td>
<td>Detergency and Cleansing</td>
<td>Goud</td>
<td>Goud</td>
</tr>
<tr>
<td>8</td>
<td>Determination of pH</td>
<td>4.21</td>
<td>4.87</td>
</tr>
<tr>
<td></td>
<td>Texture</td>
<td>Gritty</td>
<td>Gritty</td>
</tr>
<tr>
<td></td>
<td>0/o Solid Content</td>
<td>8.20%</td>
<td>8.25%</td>
</tr>
</tbody>
</table>

Table No.5 Evaluation Parameters of Herbal Shampoo.
DISCUSSION:

The herbal shampoos are the preparations which are used for the washing and cleaning of hairs and to provide nourishment. The herbal shampoos are widely used due to their no or less side effects as compared to conventional shampoos, because it contains natural or herbal ingredients rather than synthetic chemicals. Herbal shampoo does not require animal

SUMMARY

Herbal Shampoo is a cosmetic preparation which uses herbs and it is meant for washing of hair and scalp just like a regular shampoo. The herbal shampoo was formulated using natural ingredients like Acacia concinna (Shikakai), Spindus mokorossi (Reetha), Hibiscus rosa (Hibiscus Flower). The formulation at laboratory scale was done and evaluated for number of parameters to ensure its safety and efficacy. Two formulations were prepared i.e. F1 and F2 and the evaluation parameter was studied like physical appearance, foam stability, wetting test, etc.

CONCLUSION

The aim of this study was to formulate a completely herbal shampoo which is at par with the synthetic shampoo available in the market. We formulated a herbal shampoo by using plant extracts which are commonly used traditionally and landed for their hair cleansing actions across Asia. All the ingredients used to formulate shampoo are safer than silicones and poly-quatemum synthetic conditioning agents and it can greatly reduce the hair or protein loss during combing. Instead of rising cationic conditioners we have used Shikakai, Amla and other plant extracts to provide the conditioning effects.

Several tests were performed to evaluate and compare the physicochemical properties of both prepared and marketed shampoos. Our prepared shampoo showed comparable result with that of marketed shampoo for quality control tests but further research and development is required to improve its overall quality.

REFERENCES

2. Atijaz A. Shaikh, Kailas R. Biyani A text Book of “Cosmetics Science” PV Publication,
4. Mr. Amiip Saniadiian More1, Mr. Amul Supadu adhav2, Miss. Aishwarya Jaywant Kapkar 3,M r. Aditya Sanjay Pawar4, Mr. Jaydip Rajendra "1hakare5, Mr.Vishal Ashok Chaudhary6 ” Preparation and evaluation of Herbal Shampoo”. 2021. Vol (3), issue II , Page No. 11 -17.
7. Sajid A. Mulani 1, Nitin Maliz, Firoj Tanboli3*, Yogesh S. Kolekar1,Anagha S. Ajagekar,
16. IS. Kunal Das A text book of “HERBAL DRUG TECHNOLOGY” N tram Prakash an Page NO 3.45-3.47
17. Gholamrezha Dehghen Noidehe, flat iba Sharififfai , Payani Rhazaeil, Ehsan Mohajeri A Loved Jahan Baksh Formulation of herbal conditioner shampoo by using extract
19. Ashok ku mar, rakesh roshanmal, Eval nation of prepared shampoo formulation and to compare formulated