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# Development And Evaluation Of Herbal Hair Tonic For The Treatment Of Hair Related Problems

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***Abstract:*** Nowadays, people are interested in hair preparations and conditioner materials, such as shampoos, hair tonic and conditioner formulations containing herbal extracts. The Aim of present study involves preparation of herbal hair tonic by using Fenugreek leaves, Tulsi leaves, Hibiscus flower, Curry leaves and coconut oil, Almond oil, Clove oil, Eucalyptus Using the Direct Method, oil and a crude medication mixture were made into herbal hair tonic, and their antifungal and antibacterial properties were assessed. Batches F1, F2, and F3 with varying concentrations are used to construct the final preparation of these substances**.**F1, F2, F3 formulation is tested for antibacterial and antifungal activity. The formulation of different concentrations was characterized for analysis including Moisture content, Acid value, Saponification value, Specific gravity. The formulation exhibits favourable organoleptic qualities, no grittiness, good consistency, good spread ability, homogeneity, appearance, and pH, as well as good antifungal and antibacterial activity. Result was determined and are reported in this work.

**KEYWORDS:** Herbal formulations, antifungal activity, antibacterial activity, hair tonic, Coconut oil, Almond oil.

## 1.INTRODUCTION

Hair care is an overall term for hygiene and cosmetology involving the hair, which grows from the human scalp. Hair is one of the important parts of the body obtained from the ectoderm of the skin. The main function of the hair is to enhance looks and help to protect our skin and scalp. Hair care is an essential aspect of personal grooming, and various products are available in the market to promote healthy hair growth, strength, and appearance. Among these products, hair tonics have gained popularity due to their potential benefits in enhancing hair growth, reducing dandruff and itchiness, and improving overall hair health. Despite the growing popularity of hair tonics, there is a need for comprehensive research on their effectiveness, safety, and optimal usage. This study aims to investigate the effects of hair tonics on hair growth, strength, and overall health, as well as explore the perceptions and experiences of users[6].

**1.1 Hair tonic** is a liquid or semi-liquid cosmetic product designed to improve the appearance, texture, and health of the hair. Traditionally, hair tonics are used to moisturize the scalp and add shine to the hair. They may also stimulate blood circulation in the scalp, promoting hair growth. Hair grows approximately 0.3 mm/day or inches per year, while the scalp sheds 100 hairs per day[6].

**Why should you use hair tonic?**

If you prefer to just shampoo your hair, hair tonic is a great alternative to using conditioner. It's perfect when applied to freshly washed hair—less frizzy-looking. It is better to always use shampoo and conditioner first, but use hair tonic daily if you have dry or almost dry hair. It's even easier to use in a spray—simply spritz it onto your hair for a quick refresh or when your hair is fluffy, and it'll give you slightly wet-looking, effortless styles[6].

**What does hair tonic do?**

It essentially conditions the hair and scalp. If you like to only shampoo, then a hair tonic will cover some of what you lose by not employing the benefits of conditioner. It will provide a controllable texture and will eliminate that post-wash fluffy feel when clean hair dries. It also works on the finish of the hair, giving a slight sheen provided by essential oils. The key ingredients often found in hair tonic are also beneficial to the scalp. features an array of natural ingredients that benefit the hair. Cedarwood oil regulates the sebum glands, ensuring your hair doesn't get overly greasy; myrtle has an antibacterial effect, which can help avoid scalp conditions such as dandruff; and menthol has a cooling feel on the scalp while also having the added benefit of promoting blood flow, which provides an added boost to your hair follicles[6].

**1.2 Hair Related Problems:**

**Table No. 1: Hair related problems**

| Sr. No. | Problems |
|---|---|
| 1 | Hair loss |
| 2 | Premature hair growth |
| 3 | Dandruff |
| 4 | Loss of shine |
| 5 | Heat damage |
| 6 | Frizzy or Dry hair |
| 7 | Alopecia areata |
| 8 | Split end |
| 9 | Thinning Hair |
| 10 | Scalp irritation |

**1. 3 Benefits of Herbal Hair Tonic:**

**1. Promotes Hair Growth:** Herbal ingredients like curry leaves stimulate hair follicles and encourage new hair growth[5].

**2. Reduces Hair Fall:** Strengthens the hair roots by improving blood circulation to the scalp, reducing hair fall[5].

**3. Nourishes the Scalp:** Provides essential nutrients to keep the scalp healthy and free from dryness or itchiness[5].

**4. Prevents Dandruff & Scalp Infections**: Natural antifungal and antibacterial ingredients like hibiscus, clove oil, and Tulsi help fight dandruff and prevent scalp infections[5].

**5. Add Shine & Softness:** Herbal oils and extracts condition the hair, making it smoother, shinier, and more manageable[5].

**6. Strengthens Hair Strands:** Ingredients like fenugreek strengthen the hair shaft, preventing breakage and split ends[5].

**7. Balances Scalp Oil Production:** Regulates sebum production, keeping the scalp hydrated but not greasy[5].

**8. Prevents Premature Greying** : Herbs like hibiscus and curry leaves help maintain natural hair color and delay premature greying[5].

**9. Protects from Heat & Pollution:** Forms a protective layer around the hair, shielding it from environmental damage and styling heat[5].

**10. Free from Harmful Chemicals**: Unlike chemical-based products, herbal tonics do not contain sulphates, parabens, or synthetic additives, making them safe for long-term use[5].

## 2. PLANT PROFILE

### 2.1 HIBISCUS FLOWER

**Table No. 2: TAXONOMICAL CLASSIFICATION**

| Botanical Name | Hibiscus rosa-sinensis |
|---|---|
| Kingdom | Planate |
| Division | Magnoliophyta Flowering plants |
| Class | Magnoliopsida – Dicotyledons |
| Order | Malvales |
| Family | Malvaceae – Mallow family |
| Genus | Hibiscus L – Rose mallow |
| Species | Hibiscus rosa-sinensis L |
| Part Used | Flower |

**Fig. No 01**

The leaves are alternate, ovate to lanceolate, frequently with a toothed or lobed margin. The flowers are large, conspicuous, trumpet-shaped with five or more petals. This plant is extensively cultivated as an ornamental plant in tropical and subtropical regions. This plant is commonly found throughout the tropics and is found as a houseplant throughout the world[9].

**Chemical Constituents:** Flavonoids, saponins, tannins, terpenoids, alkaloids, steroids, anthocyanins, organic acids, polysaccharides, vitamins, niacin, thiamine, riboflavin, and cyanidin glucoside[9].

**Uses:**

1.Strengthen the hair and hair root.
2.Reduce premature greying of hair.
3.Enhance the Hair Growth.
4.Provide Nourishment.
5.Hibiscus stimulates hair growth by improving blood circulation to the scalp.
6. Properties strengthen the hair shaft, preventing breakage and enhancing overall hair texture.
7. Hair thickening and volumizing.
8.Treatment of dandruff[9].

### 2.2. FENUGREEK

**Table No. 3: TAXONOMICAL CLASSIFICATION**

| Botanical Name | Trigonella foenum-graecum |
|---|---|
| Kingdom | Plantae |
| Division | Magnoliophyta |
| Class | Magnoliopsida |
| Order | Fabales |
| Family | Fabaceae |
| Genus | Trigonella |
| Species | Foenum-gracecum Linn |
| Part Used | Seeds |

**Fig. No 02**

**Seeds:** The seeds are plain-surfaced, 3-5 cm long, 2 mm thick, and yellow in color. They have a rhomboidal, pebble shape. There is no taste or flavour to the nutritional fibre and protein that make up the majority of fenugreek seeds. It has been discovered that plant tissue cultures from seeds cultivated in ideal conditions Additional research has demonstrated its efficacy in treating gastrointestinal irregularities, decreasing cholesterol, and lowering blood glucose levels[9].

**Chemical Constituents:** Flavonoids, saponins, lipids, alkaloids, vitamins, carbohydrates, fibre, steroids, amino acid glycosides, mucilage, minerals, proteins, and coumarins. The most prevalent alkaloid is trigonelline, and coumarins include cinnamic acid and saponaretin[9].

**Uses:**

1.It has antibacterial, anti-fungal, and moisturizing properties and removes dandruff and irritation.
2.It helps to prevent hair fall by improving blood circulation to the scalp and nourishing the hair roots.
3.Fenugreek-rich protein and nicotinic acid help to accelerate hair growth.
4.Fight against the scalp infection.
5. Antioxidants help to repair hair damage.
6. Provide shine to hair
7.Soften the frizzy hair.
8. Protect against sun damage[9].

## 2.3 TULSI LEAVES

**Table No. 3: TAXONOMICAL CLASSIFICATION**

| Botanical name | **Ocimum sanctum** |
|---|---|
| Kingdom | Plantae |
| Division | Angiosperms (magnoliophyta) |
| Class | Dicotyledons (magnoliopsida) |
| Order | Lamiales |
| Family | Lamiaceae |
| Genus | Ocimum |
| Species | Ocimum sanctum / ocimum tenuiflorum |
| Part used | Leaves |

**Fig. No 03**

Tulsi is the most familiar herb from the Lamiaceae family, which is native to the Indian subcontinent and has been used in Ayurvedic medicine for more than 3000 years. Holy basil is an erect, many-branched subshrub 30-60 cm tall with a hairy stem. Leaves are of green or purple color. The plant of Tulsi contains several medicinal properties. Leaves of Tulsi act as a nerve tonic and also sharpen memory[9].

**Chemical constituents:** Eugenol, Linalool, beta-Caryophyllene, Tannin, Flavonoids, Carvacrol, Alkaloid, Saponin, Steroid, Ursolic acid, and Rosmarinic acid[9].

**Uses:**

1. Coagent remedy for hair loss and strengthening the hair roots.
2. Tulsi prevents bacterial and fungal infections.
3. Cooling and calming properties of Tulsi.
4. It helps to reduce anxiety and stress.
5. Tulsi stimulates hair growth, reduces hair thinning, and treats dandruff.
6. Strengthen the hair root.
7. Prevents Dandruff & Scalp Infections
8. Treats Itchy Scalp & Lice[9].

**3. Aim:** Development and Evaluation of Herbal Hair Tonic for the Treatment of Hair-Related Problems.

**Objective:**

1. To promote the hair growth and smoothness of the hair
2. Provide essential nutrients to the hair and scalp, improving hair texture, shine, and manageability.
3. To prevent dandruff, split ends, and dull hair.
4. Control frizzy hair.
5. Relaxing massage for a healthy scalp.
6. Shielding hair from damage caused by pollution, UV rays, and other environmental stressors.
7. Hydrate the scalp and hair, preventing dryness and promoting a healthy moisture balance[8].

## 4. Research Methodology

### 4.1 Collection of the selected medicinal plant:

The plants fenugreek, Tulsi, and hibiscus were collected from the MIBP College, Gondia district, Maharashtra, India.

### 4.2 Material—Drying & converting herbs into powder from:

1. **Fenugreek seed:** Drying and converting the herb into powder is an essential step in preserving it. Fenugreek seeds are obtained from the plant Trigonella foenum-graecum, which is a member of the legume family[10].
2. **Tulsi leaves:** Tulsi leaves, also known as holy basil, are an integral part of Ayurvedic medicine and Hindu culture. Select from MIBP College and Species of Tulsi, collect a Tulsi leaf from the Tulsi plant, dry it for 1-2 days, and grind it into powder form, then pass it through a sieve into fine powder form[10].
3. **Curry leaves:** The collected leaves are allowed to sun-dry for 2-3 days and ground into a coarse powder using a mortar and pestle. Weighted 30 g of crude powder for phytochemical analysis[10].
4. **Hibiscus flowers:** They have been widely used in various experimental studies due to their potential health benefits and industrial applications. Collect a specific hibiscus flower from the Hibiscus rosa-sinensis plant, dry it for 2-3 days in sunlight, grind it, and pass it through a sieve to convert it into a fine powder. Select the required quantity of hibiscus in preparation of Hair Tonic[10].

| Ingredient name | Scientific classification | Chemical constituent | Uses |
|---|---|---|---|
| **1. Coconut Oil**  | Cocos nucifera | Oleic acid, Palmitic acid, Linoleic acid, Stearic acid, caprylic acid, lauric acid | Moisturize hair &reducing breakage. Protect hair from protein loss, damage when wet. Protect your hair from environmental damage, wind, &sun smoke[10]. |
| **2.Almond oil**  | Prunus Amygdalus Dulcis Oil | Oleic acid ,Linoleic acid ,Palmitic acid, Stearic acid. Additionally, it contains vitamins A, B1, B2, B6, D, and E, as well as minerals such as magnesium and calcium. | Emollient, Help nourish Hair, Boost shine, prevent premature greying of Hair, Hair softer and smoother, strength, repair hair, treat seborrheic dermatitis[10]. |
| **3.Clove oil**  | Syzygium Aromaticum | Eugenol, linalool, carvacrol, rosmarinic acid. | Promote hair growth, stimulate blood circulation, Strength hair follicle, reduce breakage and split end, Reduce dandruff scalp infection, Hair rinse[10]. |
| **4.Eucalyptus oil**  | Eucalyptus globulus Labill | 1,8-Cineole, α-Pinene, β-Pinene, Limonene, Camphor, Terpinen-4ol, γ-Terpinene, P-Cymene, αTerpineol, Sabinene | Fragrance, Treat Dandruff, increase hair gloss, Antioxidant and anti-inflammatory, improve elasticity. Improves Hair Quality, May Increase Blood Circulation[10]. |

| | | | |
|---|---|---|---|
| **5.Curry leaves**  | Murraya Koenigii | Alkaloid, Flavonoid, Saponin, Tanin, Linalool, Terpenoid, Vitamin and minerals | Antioxidant, Control Hair loss, Clear Dandruff, Fight scalp infection, Rich amino acid- shin to hair & hair strength. Prevent thinning of hair[10]. |

**5. Preliminary phytochemical screening of drug:**

**5.1 Alkaloids:**

**1. Dragendorff test:** Drug solution + Dragendorff's reagent (potassium bismuth iodide), formation of orange-red color[1].

**2. Mayer's test:** Drug solution + Mayer's reagent (mercury potassium iodide), formulation of yellowish color[1].

**3. Wagner's test: Drug** solution + a few drops of Wagner's reagent (dil. iodine solution), formation of reddish-brown precipitate[1].

**4. Picric acid test:** drug extraction + a few drops of picric acid. Formation of yellow precipitate[1].

**5.2 Flavonoids:**

**1. Shinoda Test:** To alcoholic extraction of drug mg turning & Dil HCL Formation of red color indicates the presence of flavonoid. (pink or magenta). To the alcoholic extract of drug zinc turning and dil. HCL was added; formation of a deep red to magenta color indicates the presence of dihydro flavonoids[1].

**2. Ferric chloride test:** Drug sample + a few drops of $FeCl_3$ = greenish-black colour or blackish-red[1].

**5.3 Saponin:**

**1. Foam test:** To 1 gm of drug in a test tube, add 10-20 ml of water, shake for a few minutes, and observe the formation of frothing, which persists for 60-120 sec in the presence of saponin[1].

**5.4 Tanin:**

**1. $FeCl_3$ Test: To** the concentrated alcoholic extract of the drug, a few drops of alcoholic $FeCl_3$ solution were added. The formation of a deep green color that turned into yellow on the addition of concentrated $HNO_3$ indicated the presence of coumarin[1].

**5.5 Carbohydrates:**

**1. Molisch Test:** Dissolve a small amount of drug in 1 ml of water, add a few (1-2) drops of alcoholic alpha-naphthol, and a violet ring will appear in the tube. Add concentrated $H_2SO_4$ (sulfuric acid)[1].

**5.6 Steroids:**

**1. Liebermann-Burchard Test:** Dissolve the drug solution in acetic anhydride, add sulfuric acid into the mixture, and observe the color. Blue into green presence of steroid[1].

**5.7 EUGENOLS:**

**1. TLC:** TLC can be used to separate eugenol from acetyl eugenol. Triethylamine is used as a mobile phase.

**2. Gas Chromatography**: It is used to identify eugenol in clove extract[1].

## 7.FORMULATION OF HERBAL HAIR TONIC

**7.1 Direct Method:**

1.Herbal Hair Tonic was prepared by using 3-4 main active ingredients and oils used as a base. This tonic is an oil dosage form. 2.Collect fenugreek seeds, hibiscus flowers, Tulsi leaves, and curry leaves, and dry all these ingredients inside a hot air oven at 60-70 degrees for 20-30 minutes.

3. Prepare all these dry ingredients into powder form and transfer it from the sieve to receive fine powder.

4. Add clove oil, coconut oil, and almond oil at the required quantity in a 250 ml beaker, and boil it at a particular temperature.

5. Add the required quantity of fine powder inside the boiled oils, stir it continuously until it has mixed properly, and add fragrance (a few drops of eucalyptus oil) and preservative (methylparaben).

6. Boil this solution for 20 minutes until the color changes.

7. Cool this solution for 10 minutes.

8.After cooling, the solution is filtered by Mucilin cloth.
9.Add this solution to the bottle and store it.
10.Try to prevent this tonic from UV rays[8].

Fig. No 04

Fig. No 05

Fig No.06

**Table No. 04**: **Preparation of Herbal Hair Tonic – 50ml.**

| Sr. No. | Ingredients | F1 | F2 | F3 | Uses |
|---|---|---|---|---|---|
| 1 | Clove oil | 15ml | 12ml | 15ml | Reduce Breakage |
| 2 | Coconut oil | 30ml | 38ml | 35ml | Moisturize and protect from sun damage, |
| 3 | Almond oil | 3ml | 2.5ml | 5ml | Emollient, Boost Shine |
| 4 | Curry leaves | 2gm | 4gm | 2.5gm | Antioxidant |
| 5 | Fenugreek seed | 8gm | 10gm | 10gm | Promote Hair growth |
| 6 | Hibiscus flower | 5gm | 3gm | 2.5gm | Treat dandruff |
| 7 | Tulsi leaves | 5gm | 4gm | 2gm | Reduce anxiety and stress |
| 8 | Eucalyptus oil | 3drop | 3drop | 3drop | Fragrance |
| 9 | Methyl paraben | 0.2gm | 0.2gm | 0.2gm | Preservative |

## 8.EVALUATION OF HERBAL HAIR TONIC:

The formulation of herbal hair tonic was evaluated for its organoleptic properties and quality parameters.

**8.1 Organoleptic evaluation:** The appearance of the formulation was judged by its colour, odour, and consistency[2].

**1. Color:** We prepared a total of 3 formulations, F1, F2, and F3, to check the quality and appearance.
F1: Greenish yellow color.
F2- Greenish brown color. F3—Darkish brown color.

**2. Odor:** F1, F2, and F3 are aromatic.

**3. Taste:** Both 3 formulations are bitter in taste due to oils and ingredients[2].

**8.2 Quality Evaluation:** The herbal hair tonic was evaluated to determine the physical parameters such as moisture content, acid value, saponification value, pH, viscosity, and specific gravity. Biological parameters like skin irritation, spread ability, and consistency[2].

**1. pH:** The pH of herbal hair tonic was determined using a digital pH meter. Prepared F1, F2, and F3, each 100 ml solution in a beaker; took 90 ml of water and added 10 ml of hair tonic solution; and dipped the bulb of the pH meter in the hair tonic solution. The pH value displayed is recorded[2].

Fig No. 07-F1

Fig No. 08-F2

Fig No. 09-F3

**2. Moisture Content:** Calculate F1, F2, and F3 hair tonic; add 5 gm of each herbal hair tonic sample to 3 beakers, and place them into a preheated and reweighted crucible, and then heat at 105°C for at least 24 hr. Allowed to cool, it was placed into a desiccator at room temperature; after heating and cooling, it was re-weighted. The moisture and volatile content were calculated using formula[2].

**Moisture content = (Initial weight - Final weight)/Initial weight × 100**

**3. Acid Value:**

1. Preparation of 0.1M Solution: Weigh 0.56 gm of NaOH pellets and dissolve them in 100 ml of water in a beaker, and stir it until it dissolves properly. 2.
2. Preparation of Sample: Making a 1:1 ethanol & ether solution in a beaker, i.e., 25 ml ethanol and 25 ml ether. Prepare the above solution in 3 conical flasks and add 10 ml of tonic sample into each flask.
3. Process: First, add 0.2 ml (2-3 drops) of phenolphthalein into the conical flask as an indicator and titrate with 0.1M NaOH. Pink or red color is due to the indicator[2].

Acid value = 5.61V N / W

Where V = Volume of standard sodium hydroxide used (ml) N = Normality of the sodium hydroxide solution W = Weight of the sample (g).

Fig No. 10

**4.Viscocity:** Higher the viscosity of liquid, Greater the resistance to flow. The viscosity was determined using Ostwald's viscometer and the readings recorded.

1.Use 2 Ostwald viscometer for water and tonic, set a timer, fill it from 1 side and suck the tonic from another side and measure. the timing to fulfil tube for 3 times for 3 different tonics.

2.Meaure same timing of water using this Ostwald Viscometer.

3.Calculate density of water i.e. 1g/cm$^3$ and Tonic by using density bottle[2].

**$\mu = (\mu\_ref \times \rho\_test \times t\_test) / (\rho\_ref \times t\_ref)$**

Where's u= Viscosity of the test tonic

$\mu\_ref$ = Viscosity of the reference water

$\rho\_test$ = Density of the test tonic

$\rho\_ref$ = Density of the reference water

t_test = Efflux time of the test tonic

t_ref = Efflux time of the reference water.

**Viscosity of water: n= k.t.p**

k= Constant specific to viscometer, K= 0.01 to 1mm$^2$/s **Density= Mass/Volume**

t= time taken to flow, p= density of water[2].

**5. Specific Gravity:** Calculate the specific gravity of F1, F2, and F3 of the herbal hair tonic. A specific gravity bottle was rinsed with distilled water, dried in a hot air oven for 15 minutes, cooled, capped, weighed (g), and the weight noted (A). Now the same specific gravity bottle was filled with the sample, capped, and again weighed (B). Again, the bottle is emptied, thoroughly cleaned, rinsed with distilled water, dried for 15 minutes in the oven, cooled, filled with distilled water, and weighed[2].

**Specific Gravity = B-A / C-A**

Where A = weight (g) of specific gravity bottle,

B = weight (g) of specific gravity bottle with oil,

C = weight (g) of specific gravity bottle with water.

**6. Skin Irritation Test:**

Calculate the irritation test of F1, F2, and F3 Tonic; apply to 1 cm of skin on the hand after cleaning with absolute alcohol and expose to sunlight for 4-5 minutes and observe and record their response[2].

**7.Saponification Value:**

1. Preparation of 0.5N alcoholic NaOH: 1 gm of NaOH pellets was dissolved in 75 ml of ethanol and kept undisturbed for 30 minutes.
2. Preparation of 0.5N HCL: Formation of 100ml solution in which 1.35ml concentrated HCL and 98.65ml water are in Beaker.
3. Preparation of Sample: Take 3 conical flasks for F1, F2, and F3, add 1 ml of tonic sample in each conical flask, add 25 ml of 0.5 N NaOH, and titrate against 0.5 N HCl using phenolphthalein indicator. The blank titration was performed with HCl, excluding Herbal Tonic Sample[2].

**Saponification value = 56.1(B-S) N/W**

Where B = volume of standard HCl (ml) required for the blank, S = volume of standard HCl (ml) required for the sample, N = normality of standard HCl, and W = weight of the oil (g) used for the test.

**Fig. no. 11**

**8.Antibacterial Test**:

1.The cup plate method was used to check the antibacterial activity. Bacteria Escherichia coli Gram Positive was used. Prepare an agar solution in which 5 gm of agar powder is added to 100 ml of water in a conical flask. Close it properly with cotton and place it in an autoclave for 20 minutes, then add phenolphthalein indicator.

2.Agars for antibacterial activity were used as culture media, set in solid form, and spread bacteria, and cavities were aseptically made over the culture plates using a borer (9 mm internal diameter).

3.Cavity filled with F1, F2, F3 Tonic, and Standard Tonic. The plates were incubated at 37°C for 24 hrs.

4. After 24 hours, close the incubator and see the culture activities were determined by measuring the diameter of the zone in mm[2].

**Result showing antibacterial activity of formulation F1, F2, F3 and standard on E. coli.**

**Cup plate method**

**Fig. No. 13**

**After Incubation**

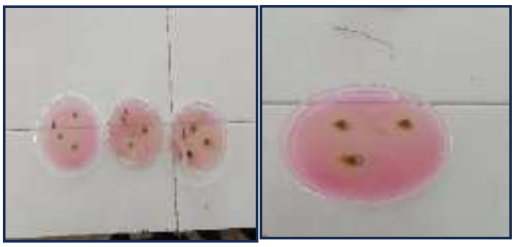

**Fig No. 14**

## 9. RESULT AND DISCUSSION

### 9.1 Result:

**Table. No. 05: Qualitative Evaluation and Organoleptic characteristics of Herbal hair tonics.**

| Sr. no | Parameter | F1 | F2 | F3 |
|---|---|---|---|---|
| 1 | Moisture content | 51.35% | 52.83% | 66.08% |
| 2 | Acid value | 0.75mgNaOH/g | 0.802mgNaOH/g | 0.92mgNaOH/g |
| 3 | Specific gravity | 0.972 | 0.958 | 0.988 |
| 4 | pH | 7.46 | 6.29 | 7.33 |
| 5 | Viscosity | 2.72Pa.s | 2.73Pa.s | 1.98Pa.s |
| 6 | Saponification Value | 131.83 | 201.96 | 246.84 |
| 7 | Spread ability | Good | Good | Good |
| 8 | Color | Greenish brown | Greenish brown | Darkish brown |
| 9 | Odor | Aromatic | Aromatic | Aromatic |
| 10 | Taste | Bitter | Bitter | Bitter |
| 11 | Skin irritation | No | No | No |

**Table. No.06: Preliminary Phytochemical screening of herbs**

| Sr.no | Chemical constitutes | Test | Fenugreek | Hibiscus |
|---|---|---|---|---|
| 1 | Alkaloids | Dragendroff test | +ve | -ve |
| 2 | Flavonoid | Shinoda test | +ve | +ve |
| 3 | Saponin | Foam test | +ve | +ve |
| 4 | Carbohydrate | Molisch test | +ve | -ve |
| 5 | Tannins | Ferric chloride test | -ve | +ve |

| | | | | |
|---|---|---|---|---|
| 6 | Steroid | Liebermann Burchard test | +ve | -ve |

**Table No.07: Anti- Bacterial test- Zone of inhibition values at different concentrations of herbal Hair Tonic.**

| Name organism | Concentration (ml) | Zone of inhibition (mm) | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| **Escherichia coli** | 0.1 | 8.7 | 1.02 | 1.08 |

**9.2 DISCUSSION:** Development and Evaluation of the Herbal Hair Tonic was carried out to formulate tonic using the herbal ingredients with an act of courage to minimize the side-effects. The prepared formulation was used for formulating herbal hair tonic that contains fragrance, preservatives and crude drugs. The formation of hair tonic in three various percentage has been done as a confirmatory action.

## 10.CONCLUSION

This study explored the ingredients, benefits, and uses of herbal hair tonic. The use of hair tonic as herbal remedy has shown promising results in treating various hair-related problems. With its rich blend of natural ingredients, hair tonic helps to nourish and strengthen hair follicles, promoting healthy hair growth and reducing the risk of hair loss. Its anti-inflammatory and antioxidant properties also help to soothe scalp irritations, reduce dandruff, and protect against environmental stressors. Furthermore, hair tonic's ability to balance the scalp's natural pH and oil production helps to prevent conditions such as itchiness, flakiness, and greasiness. Overall, hair tonic offers a safe, effective, and natural solution for addressing various hair-related concerns, making it an excellent addition to any hair care routine.

## 11.ACKNOWLEDGEMENT

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## 12.REFERENCES

1. Rajesh, H., & Rao, S. (2013). **"Phytochemical analysis of aqueous extraction of *Ocimum sanctum* Linn".** *International Journal of Universal Pharmacy and Bio Sciences*, March-April, 464–465. Retrieved from http://www.ijupbs.com

2. Badhe, N., Shirode, L., & Lale, S. (2015). **"Formulation and evaluation of herbal hair tonic".** *World Journal of Pharmaceutical Research*, 4, 1807. https://www.wjpr.net

3. Lanjewar, A., Maurya, S., Gaur, A., & Sharma, D. (2020**). "Review on hair problem and its solution".** *Journal of Drug Delivery and Therapeutics*, June, 328. http://jddtonline.info

4. Sabu, M., Sojan, O., Prathibha, C., Kavitha, P. N., & Saraswathi, C. D. (2021). **"Formulation and evaluation of herbal hair oil".** *National Journal of Pharmaceutical Sciences*, 1(2), 94–97. https://www.pharmajournal.net

5. Leny, Fitri, K., Lase, Y. K., Hafiz, I., & Iskandar, B. (2022). **"Formulation of hair tonic from ethanol extract of sea hibiscus (*Hibiscus tileaceus* L.) leaves in promoting hair growth on guinea pig (*Cavia porcellus*)"**. *Journal of Drug Delivery and Therapeutics*, 12(2), 1–5. https://doi.org/10.22270/jddt.v12i2.5364

6. Goswami, B., & Mukhopadhyay, S. (2022). **"A brief review on herbal hair tonic".** *International Journal of Health Sciences*, 6(S4), 7094–7109. https://doi.org/10.53730/ijhs.v6nS4

7. Munde, G. R., Ramesh, D. S., Bhalerao, A. A., & Hingane, L. (2024). **"Formation and preparation of herbal hair tonic".** *International Journal of Advanced Research in Science, Communication and Technology*, 4, 535–538. https://www.ijarsct.co.in

8. Shekhar, P., Virendra, G., Vikas, R., Gajanan, D., Pooja, J., Sonali, U., & Gajanan, S. (2024). **"Formulation and evaluation of herbal hair oil".** *International Journal of Novel Research and Development*, 9, 881–886. https://www.ijnrd.org

9. Sandip, C., Rushikesh, B., Piyush, B., Mayur, B., Rutuja, D., & Sonwane, G., et al. (2024). **"Formulation and evaluation of herbal hair oil".** *Open Access Journal of Pharmaceutical Research*, 8, 3–5.

10. Indumani, A. V. V., Sahithi, I., Maheshwari, K., Vaishnavi, K., Sridevi, P., & Raju, M. B. (2024). **"Formulation and evaluation of herbal hair oil".** *International Journal of Pharmaceutical Sciences Review and Research*, 84(2), 18–22. http://www.globalresearchonline.net