



Formulation And Evaluation Of Hibiscus Flaxseed Herbal Hair Gel

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ABSTRACT

Hair loss are the common problems of today's generation for men and women both. Due to increase in pollution and chemicals which are directly or indirectly used in the form of shampoos, hair gels and other hair care products. Hair loss, hair thinning, dandruff and early whitening of hair are the most common problems faced by people. There are a variety of herbal plants which can be used to promote hair growth which provide natural minerals and oils to our hair in comparison to chemical-based products. The present work is done by formulating and evaluating Hibiscus and flaxseed herbal hair gel. The present study focuses on preparation and evaluation of herbal gel which is full of benefits as compared to other gel. Rich in fatty acids and antioxidants, flaxseed, sometimes referred to as linseed, aids in the removal of pollutants and dead cells from the scalp. Applying flax seed gel to the scalp and hair as a moisturizer can help to promote hair growth and strengthen existing hair. Hibiscus rosa-sinensis is a medicinal plant member belonging to the family Malvaceae. Hibiscus rosa-sinensis is used for the treatment of various diseases including alopecia. Herbal hair gels help to overcome the various damages caused by chemical agents in various marketed products.

Keywords: Aqueous extract, Carbopol, Hibiscus, Flaxseed, Hair Gel and Herbal.

INTRODUCTION

Alopecia is a wide issue, for both genders. In the traditional system of drug, a variety of natural origin cures shown exertion for hair growth. After a detailed literature check carried out on crude medicines reveals essential information regarding the selection of medicines for the expression of an ornamental expression for the creation of hair growth exertion. Hence, the present study was aimed to estimate the hair growth exertion of polyherbal excerpt gel, which includes attention. Traditionally, several plants and their products and extract have been used in hair gel preparation (as herbs or spices) as a mode of hair growth agent as well as a cure for some of the common illnesses that affect people. This property of curing is attributed mainly to their hair growth properties. Many reports are available where in flowers or their extracts have been shown rich hair growth properties¹. Hibiscus rosa-sinensis (family Malvaceae) is a woody, perennial ornamental shrub that grows abundantly in tropical climates. Previous studies have indicated H. rosa-sinensis to possess hair growth properties and is recommended to be used as an herbal alternative to cure many diseases². On the other hand, flaxseed is Known as flax. Flaxseed is considered a nutrition powerhouse for its combination of essential macro and micronutrients. These include protein, omega-3 fatty acids, fibre, and antioxidants³. Based on this, the present study was aimed to preparation of herbal hair gel with extract of hibiscus rosa-sinensis and extract of flaxseed. The present study is also aim to evaluate the herbal hair gel for its pH, viscosity, skin irritation test, washability, Phytochemical analysis for the presence of compound in the sample. Looking at the above properties of hibiscus rosa-sinensis and flaxseed, the present study was planned

to prepared an herbal hair gel formulation with hibiscus rosa-sinensis and flaxseed extract and to evaluate various parameter

1.1 INGREDIENTS USED

Hibiscus Rosa- Sinensis

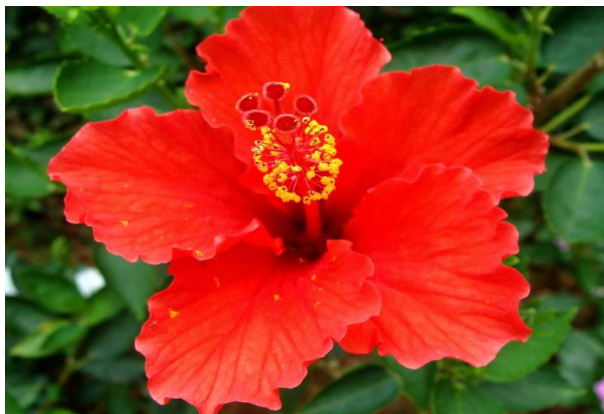


Fig :1 Hibiscus Rosa Sinensis

Hibiscus Rosa Sinensis is a member of the Malvaceae family. Numerous studies have demonstrated the anti-inflammatory, antimicrobial, antidiabetic, anti-ulcer, hepatoprotective, antifertility, and antioxidant qualities of the various components of Hibiscus rosa sinensis plants, which aid in the treatment of numerous diseases. The report suggested that it contains Tannins, Flavonoids, Steroids, Alkaloids, Saponins, Total phenols, Total flavonoids, Total proanthocyanidin. It has been also reported that it contains majorly Anthocyanins and flavonoids; cyanidin-3,5-diglucoside, cyanidin-3-sophoroside-5-glucoside, quercetin-3,7-diglucoside, quercetin-3- diglucoside. ^{4,5}

Uses of Hibiscus rosa sinensis

Leaves and flowers can be used as a hair growth promoter ¹⁹. It is used to prevent premature greying and to treat scalp disorders. It considered as a natural emollient hair conditioner and was used in hair washes, treatments and vinegar rinses for the hair ^{13,14}. Hibiscus rosa sinensis flower are promising sources of potential antibacterial value and may be efficient as preventive agents for some diseases

Flaxseed



Fig :2 Flaxseed

In Indian languages, flaxseed, also known as linseed (*Linum Usitatissimum*), is commonly referred to as Alsi, Jawas, or Aksebija. Flax (*Linum usitatissimum*) belonging to family Lineaceae. Rich in nutritional fibre, protein, and fat is flaxseed. The composition of flaxseed can vary with genetics, growing environment and method of seed processing ¹⁶. Flaxseed (also known as linseed) is emerging as an important functional food ingredient because of its rich contents of α -linolenic acid (ALA, omega-3 fatty acid), lignans, and fiber ¹⁷. Flaxseed oil, fibres and flax lignans have potential health benefits such as in reduction of cardiovascular disease, atherosclerosis, diabetes, cancer, arthritis, osteoporosis, autoimmune and neurological disorders. ¹⁸

Uses of Flaxseed

Rich in fatty acids and antioxidants, flaxseed aids in the removal of pollutants and dead skin cells from the scalp. You can use flax seed gel as a moisturizer on your hair and scalp. Aid in promoting new hair development and strengthening existing hair. Topical formulations come in the form of oils, creams, ointments, pastes, and gels; among these, gels are becoming more and more well-liked these days due to their increased stability and ability to offer controlled release in comparison to other semisolid preparations²¹. The gel formulations can provide better absorption characteristics and hence the bioavailability of drug¹⁵

2. MATERIALS AND METHODS

Step-1: Preparation of Hibiscus extract⁷

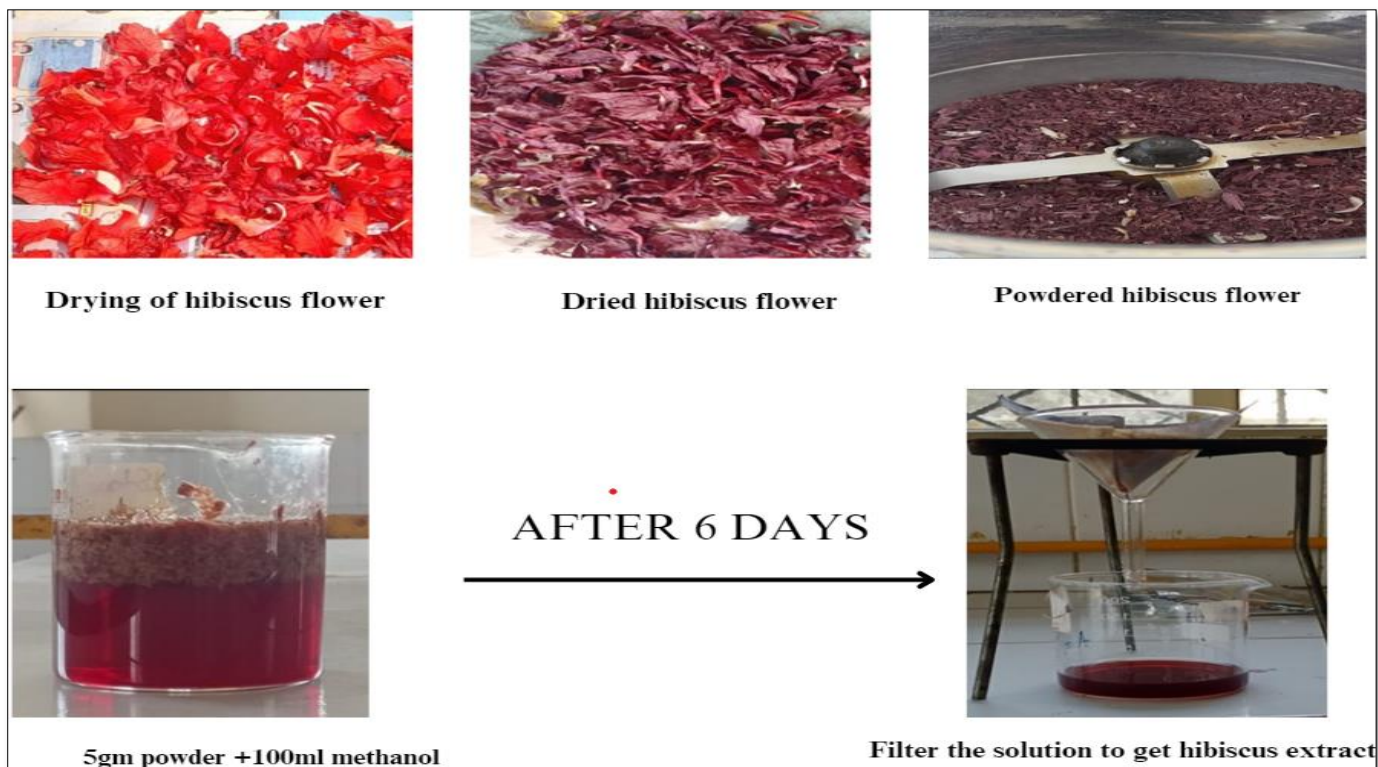


Fig :3 Preparation of Hibiscus Extract

Weigh 5gm of hibiscus powder and transfer into beaker containing 100ml of methanol. Solvent containing hibiscus was kept for 6 days with occasional stirring. The mixture was filtered after 6 days. The filtrate was stored in fridge.

Step-2: Preparation of Flaxseed extract ⁸

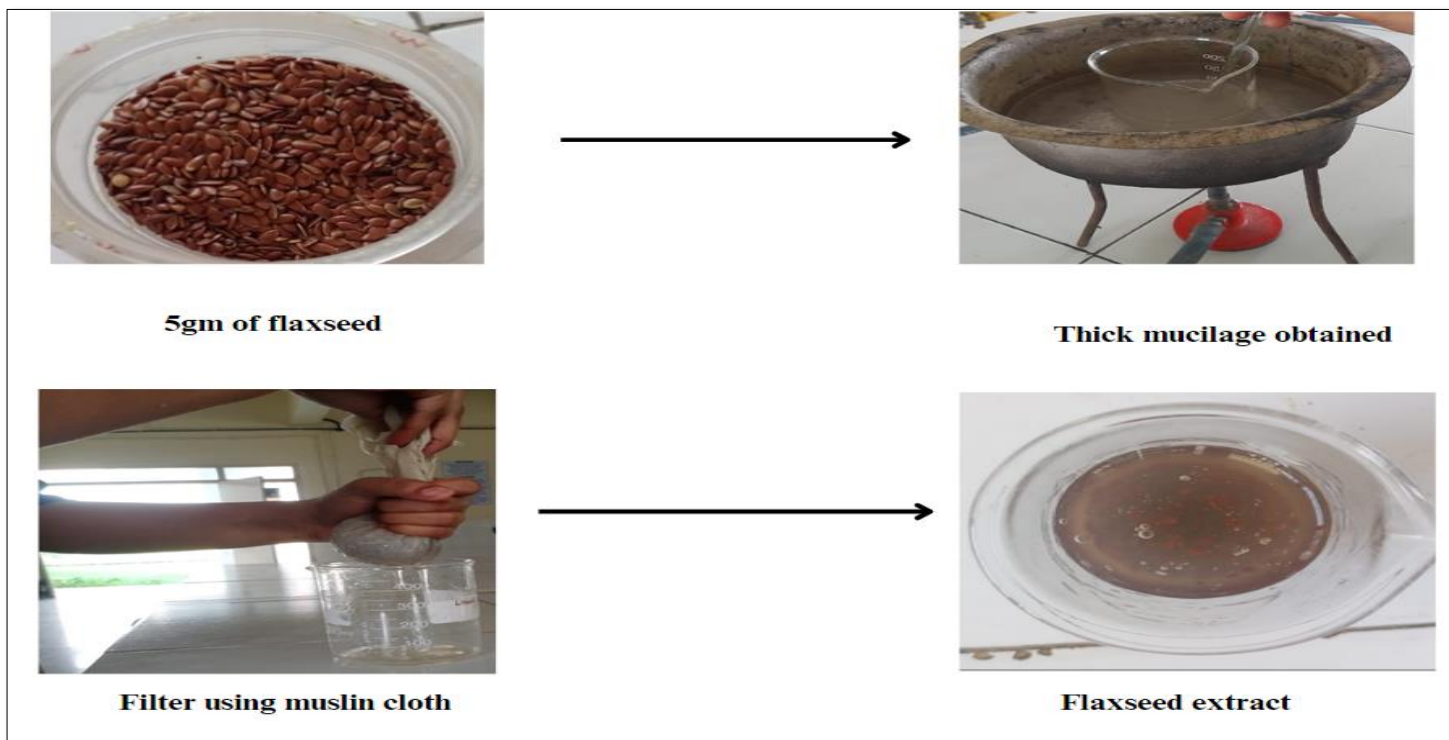


Fig :4 Preparation of Flaxseed Extract

Weigh 5gm of flaxseed. Transfer in to 100 ml water Transfer the beaker containing flaxseed into water bath. Boil it, with constant stirring until a thick mucilage was prepared. Then the mucilage was strained using suitable sieve.

Step-3: Preparation of gel and incorporation of extracts

Table 1: Formulation of Hair gel base

Name	F1	F2	F3	F4	F5
Carbopol 934(gm)	0.5	1	1.5	2	2.5
PVP (mg)	5	5	5	5	5
Methyl paraben(mg)	75	75	75	75	75
Glycerine (ml)	3	3	3	3	3
PEG (ml)	6.25	6.25	6.25	6.25	6.25
Triethanolamine (ml)	0.5	0.5	0.5	0.5	0.5
Water (ml)	30	30	30	30	30

Table 2: Formulation of herbal hair gel

Name	H1F4	H2F4	H3F4	H4F4	H5F4
Hibiscus extract %	5	10	15	20	25
Flaxseed extract %	5	10	15	20	25
Carbopol 934 (gm)	2	2	2	2	2
PVP (mg)	5	5	5	5	5
Methyl paraben (mg)	75	75	75	75	75
Glycerine (ml)	3	3	3	3	3
PEG (ml)	6.25	6.25	6.25	6.25	6.25

Triethanolamine (ml)	0.5	0.5	0.5	0.5	0.5
Water (ml)	30	30	30	30	30

2.1 Formulation of hibiscus flaxseed herbal hair gel

Five different herbal hair gel formulations were prepared by simple gel preparation method with Carbopol 934 gel base⁹. Take 30 ml of distilled water in a beaker. Add measure quantity of methyl paraben and glycerin measure quantity of polyethylene glycol was dissolve in 30 ml distilled water in beaker with stirring add Carbopol 934 with slowly stirring then triethanolamine was added slowly with continuous stirring to obtain gel structure finally varying concentration (5%,10%,15%,20%,25%) of aqueous extract of flaxseed and methanolic extract of hibiscus was added into Carbopol gel and stirred. The prepared gel formulation was stored at room temperature⁸.

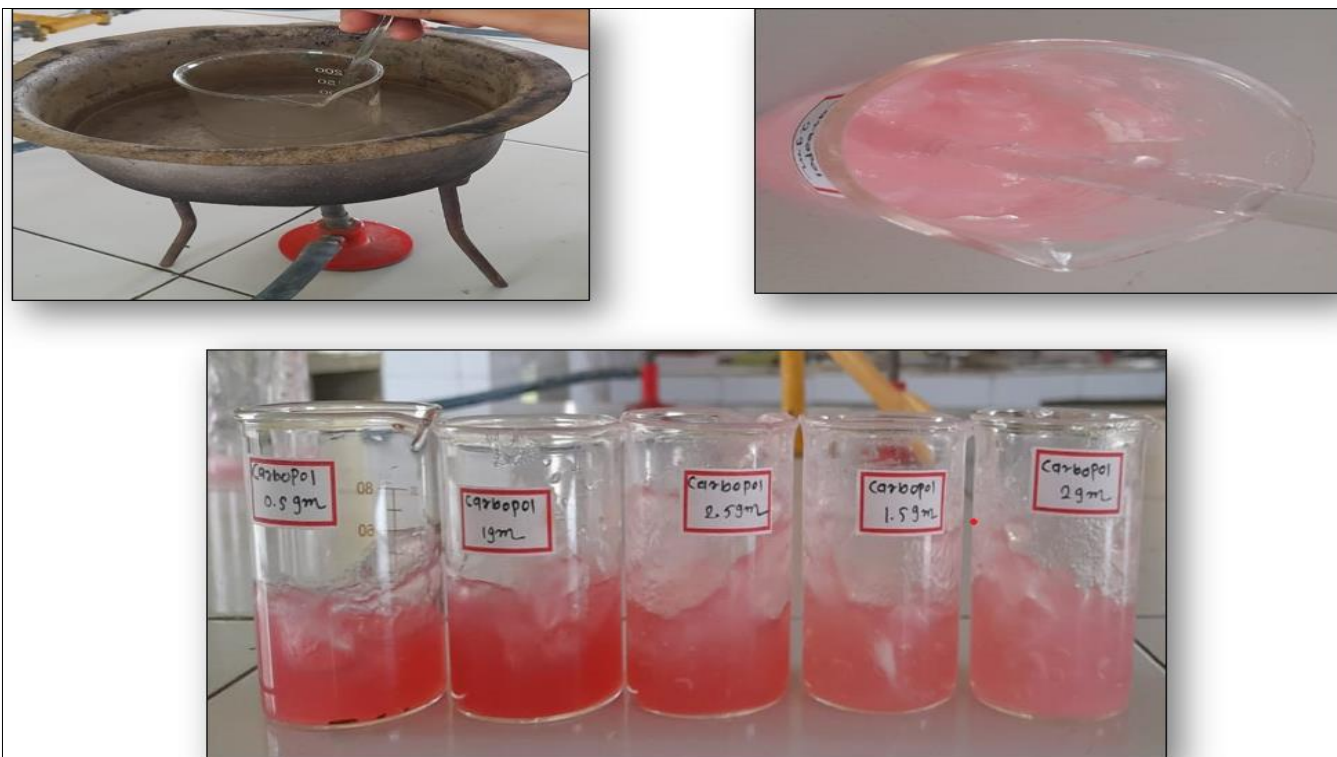


Fig :5 Formulation of hibiscus flaxseed herbal hair gel

3. EVALUATION OF HERBAL HAIR GEL FORMULATIONS

3.1 Phytochemical analysis of Hibiscus extracts

Detection for alkaloids²⁰

Dragendroff's test- Dissolve the herbal extract in chloroform. Evaporate chloroform and acidify the residue by adding few drops of Dragendroff's reagent (Potassium Bismuth Iodide).

Mayer's test- 2-3 ml of filtrate with few drops of Mayer's reagent

Wagner's test- 2-3 ml of filtrate with few drops of Wagner's reagent.

Detection for Carbohydrates¹⁰

Fehling's test- 1 ml. Fehling's A and 1 mL Fehling's B solutions should be boiled for one minute. Pour in an equal volume of test extract solution. 5-10 minutes in a boiling water bath.

Benedict's test- In a test tube, combine an equal proportion of Benedict's reagent and test extract 5 minutes in a boiling water

Detection for Flavonoids¹⁰

FeCl₃ Test -To the alcoholic solution of the extract add few drops of neutral ferric chloride solution

Lead acetate solution Test- Test solution with few drops of acetate solution (10%).

Detection for Phenols¹⁰

Ferric chloride test - Few drops of the extract were treated with 5% aqueous ferric chloride

3.2 Phytochemical analysis of flaxseed extract¹¹

Detection for Tannins

Braymer's test- 2 ml of extract was allowed to react with 10% alcoholic ferric chloride solution.

Detection for Saponins

Foam test-1 mL of extract was diluted with distilled water to 20 mL and shaken in cylinder for 15 minutes.

Detection for alkaloids

Dragendroff's test- Dissolve extract of the herbal drug in chloroform. Evaporate chloroform and acidify the residue by adding few drops of Dragendroff's reagent (Potassium Bismuth Iodide).

Detection for Quinones

Alcoholic KOH test-1mL plant extract + few mL alcoholic potassium hydroxide.

Detection for Phenols

Iodine test- 1mL extract + few drops of dil. Iodine solution.

3.3 Physical appearance

The physical appearance of the herbal hair gel formulation was checked visually for colour and feel on application. Results are as shown in table¹²

3.4 Homogeneity

After the preparation of the gel the gel was visually checked for presence of any lumps and aggregates.²²

3.5 pH determination

After the preparations of different hair gel formulations its pH was determined. 1 gm of hair gel was dissolved in 100ml of distilled water and kept for 2 hrs. after 2hrs pH was noted. The pH was determined 2 times for each herbal hair gel formulation and its average value was taken. The results are presented in table.¹²

3.6 Washability

The prepared hair gel formulation is applied on the skin and then ease and extent of washing with water is checked normally.¹²

3.7 Spreadability

2 gm of hair gel was placed between 2 glass slides. 500g of weight was placed on the slides. The weight was placed for specific period of time for 5 minutes. The hair gel spreads in a circular way its diameter was measured from different points.

Spreadability was calculated by using formula.¹²

$$S = M.L/T$$

Where, S= Spreadability, M=weight on the slide, L=Diameter of the formed circle (cm), T=time (sec)

3.8 Skin irritation test

Applied the herbal hair gel formulation on the skin and observe for irritation, redness or rashes.¹²

3.9 Stability study

Stability is the ability of a formulation to withstand the different environmental factors like heat, cold, moisture, humidity and should remain within its therapeutic, chemical, physical and toxicological specifications. Stability testing is to provide evidence on how the quality of a drug substance or drug product varies with time under the influence of a variety of environmental factors such as humidity and light, and enables recommended storage conditions, re-test periods and shelf lives to be established. In the present work the formulation was stored at room temperature (25–30°C) for 30 days and observed for any changes in their physical characteristics and evaluation parameters.¹²

3.10 Anti-bacterial Assay

The topical formulation was tested against selected pathogenic strains of bacteria. The antibacterial activity of Hibiscus-Flaxseed hair gel was assayed by agar disc diffusion method. The various Hibiscus-Flaxseed hair gel formulation was tested against staphylococcus aureus. All the pathogenic bacteria under study were revealed by their respective zones of growth inhibition. The antibacterial screening was done by disc diffusion method. The gels were tested against bacterial agents namely S. aureus. Nutrient agar media was first sterilized and then poured into petri plates. (5.6gm in 200ml water). After solidification, 0.1ul of the inoculum was spread over the agar evenly using a rod. A standard antibiotic Kanamycin was used. 6mm diameter were made with sterile corkborer and wells were loaded with the formulation. After 24hr of incubation, formulation efficiency However, the formulations displayed a variable degree of anti-bacterial activity against the tested strains. The various Flaxseed-Hibiscus hair gel formulation was active against all the pathogenic bacteria under study as revealed by their respective zones of growth inhibition. However, the formulation displayed a variable degree of anti-bacterial activity against the was determined in terms of zone of inhibition. The antibacterial activity was evaluated by observing the zone of inhibition with all the formulation against the tested microorganisms.

4. RESULTS AND DISCUSSION

4.1 Phytochemical analysis of Hibiscus extracts

Table 3: Qualitative phytochemical investigation of Hibiscus extract

Sr. no	Plant constituents	Test performed	Result
1	Test for Alkaloids	Dragendroff's test Mayer's test Wagner's test:	+ + +
2	Test for carbohydrate	Fehling's test Benedict's test	+ +
3	Test for phenols	Ferric chloride test	+
4	Test for flavanoids	Lead acetate solution test FeCl ₃ test	+ +

4.2 Phytochemical analysis of flaxseed extract

Table 4: Qualitative phytochemical investigation of Flaxseed extract

Sr.no	Plant constituents	Test performed	Result
1	Test for tannins	Braymer's test	+
2	Test for saponins	Foam test	+
3	Test for alkaloids	Dragendroff's test	+

4	Test for quinones	Alcoholic KOH test	+
5	Test for phenols	Iodine test	+

“+” Sign shows the presence of phytochemical constituents. “-” Sign shows the absence of phytochemical constituents.

4.3 Physical appearance

The colour of all the herbal gel formulations H1F4, H2F4, H3F4, H4F4 and H5F4 were found to be light pink with translucent appearance which was found to be smooth on application. The results are shown in Table no-6.

4.4 Homogeneity

By visually inspecting each herbal hair gel to ensure there were no lumps, flocculates, or aggregates present, the homogeneity of the product was tested. For every formulation, the homogeneity was found to be satisfactory. The results are shown in Table no-6.

4.5 pH determination

The pH of all the herbal gel formulations ranged between 6.7 to 7.3, that suited the hair, indicating the compatibility of the herbal gel formulations with the hair. The results are shown in Table no-6.

4.6 Washability

The prepared herbal hair gel was applied then washed in water. After washing there is no trace of gel.

4.7 Spreadability

Spreadability plays an important role in consumer acceptability and help in uniform application. The results are shown in Table no-6.

4.8 Skin Irritation

The prepared herbal hair gel was applied on skin of hand and exposed to sunlight for 4-5 min. It was found skin compatible and non-irritant.

4.9 Stability studies

The stability studies were conducted for all the formulations for a period of 3 months. No appreciable changes were found for the tested parameters like appearance, pH at both the temperatures (room temperature and 40 °C).

4.10 Anti-bacterial activity

The prepared herbal hair gel showed nearly a zone of inhibition as standard antibiotic Kanamycin.

H5F4 was not included in this assay as it was degraded within 1 week.

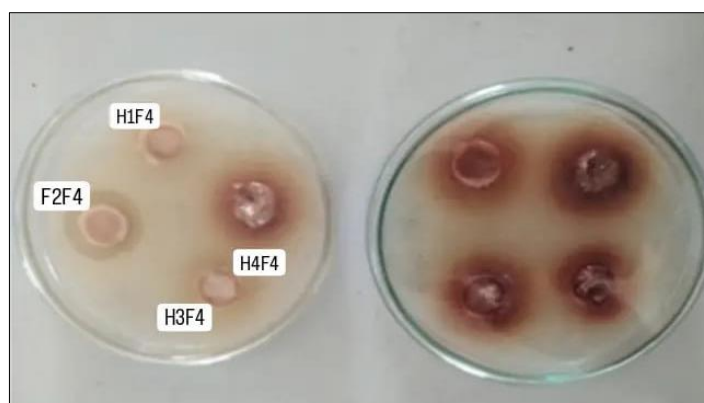


Fig :6 Anti-bacterial activity (*Staphylococcus aureus*)

Table 5: Anti-Bacterial activity of Herbal Hair Gel

Formulated Hair Gel	Standard Kanamycin	Zone of inhibition (mm)
H1F4	20	19
H2F4	20	18
H3F4	20	19
H4F4	20	17

Table 6: Evaluation of herbal hair gel

Formulation Code	Physical appearance	Homogeneity	*pH	Spreadability cm/sec
H1F4	light pink with translucent appearance	Good	6.8	12
H2F4	light pink with translucent appearance	Good	6.8	12
H3F4	light pink with translucent appearance	Good	6.9	11
H4F4	light pink with translucent appearance	Good	7.3	10.3
H5F4	light pink with translucent appearance	Good	7.1	11

5. FINAL FORMULATION



Fig 7: Final Formulation

6. DISCUSSION

The study is performed with an aim to develop Hibiscus Rosa Sinensis and Flaxseed herbal hair gel. Five different hair gel formulations were prepared. Out of five different formulation the H1F4 formulation gave appropriate colour, homogeneity, pH, spreadability, skin irritation and stability study to minimised side effects of Herbal hair gel all formulation are formulated & evaluated for every formulation. According to the evaluation parameters performed H1F4 formulation was best formulation from the rest 4 formulation.

7. CONCLUSION

The formulation of Hibiscus Rosa Sinensis and Flaxseed herbal hair gel provides a good base for treating the scalp and strengthens the hair thereby preventing the hair fall. There is a further scope for pharmacological studies in lower animals.

8. ACKNOWLEDGEMENT

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