

FORMULATION AND EVALUATION OF HERBAL GEL CONTAINING FENUGREEK AND BRAHMI EXTRACTS FOR THE TREATMENT OF DANDRUFF

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Abstract: Human body, have fewer side effects, and are more effective than synthetic drugs, herbal formulations for primary healthcare are in high demand worldwide, particularly in India. A wide range of products, including preparations for skin and hair care, use gels. The goal of the current study is to create and assess an herbal hair gel for the treatment of dandruff using aqueous extracts of fenugreek, neem, and hibiscus as well as various concentrations of Carbopol 934 as the gel base. Herbal gel was assessed based on a few factors, including its physical appearance, pH, homogeneity, Spreadability, viscosity, extrudability, and anti-fungal activity. Different formulations were made and compared and the best formulation was evaluated.

Keywords: Fenugreek, Brahmi, Plant Extract, Gel, Dandruff, Herbal gel formulation

Introduction:

Herbal medicine is still the backbone for about 75-80% of the world. this is because the population, especially in developing countries, has improved its culture of primary health care. better compatibility with the human body and fewer side effects. herbal medicine consists of a plant or part of a plant to treat injury, illness, or disease, used for prevention and treatment. to promote illness or disease, or health and healing. it is a drug or its preparation. plants are used for such purposes. (Jadhav *et.al.*, 2015). Herbal medicine is the oldest health method known to mankind. since the aurora of humanity, there has been a relationship between life and disease and plants. there is no record of human use of synthetic drugs in prehistoric times. they tried to take advantage of what was readily available. the common thing they could find was the environment, the plants, and animals. (Jain P. *et. al.*, 2016, Qazi *et.al.*, 2016). So, the aim of the present study was to formulate and evaluate the herbal gel containing fenugreek seeds and Brahmi extracts.

Seborrheic dermatitis, also known as dandruff, is a scalp condition brought on by *Pityrosporum ovale*. It is a chronic, non-inflammatory condition of the scalp that is characterised by excessive scaling of scalp tissue, making it one of the most prevalent dermatological skin conditions (Salim *et. al.*, 2020) To treat dandruff, many antifungal ingredients are used in hair care products. Many adverse reactions to these products have been reported, including hair loss, increased scaling, itching, irritation, nausea, and headache (Maderson PF *et. al.*, 2003, Patel RP *et. al.*, 2009).

MATERIALS AND METHODS**Collection**

The Fresh Plant Leaves of Fenugreek, Brahmi were collected from a medicinal

garden of our college. Other Polymers and chemicals used in the present study were of analytical grade purchased from Pharmaceutical Industry, Jaipur.

EXTRACTION

Preparation of Plant Extract

Fenugreek, Brahmi fresh plant leaves were carefully chosen and washed with distilled water to remove unwanted foreign substances like soil and dusts. After being cleaned, plant material was dried at room temperature in the shade, shielded from the sun (Imtiaz *et. al.*, 2017,). Then it was roughly ground into small pieces using a mechanical device. were crushed and turned into powder using a blender. After being processed through sieve no. 40, the ground plant material was placed in an airtight container for later use. Weighing the desired amounts of herbal drug, each herb was then macerated with water in a conical flask. For five days, a conical flask with moderate shaking was used to mix dried herbs with water. After five days, content was removed using the standard filtration method, and filtrates were collected in separately vessel. The extracts were preserved in airtight containers and kept at 6°C until further use.

Composition of extract

S.No	Ingredient Name	Quantity
1	Fenugreek Extract	500 mg
2	Brahmi Extract	200 mg

Filtration

Filtration of extract was done by using simple filter paper and funnel three times.

Evaporation

Electronic water baths were used for the evaporation process. Until the desired concentration of the extract was attained, filtrates were allowed to evaporate in an evaporating pan at a temperature of 60°C.

FORMULATION OF HERBAL GEL

Preformulation Study

To ensure the development of a stable dosage form that is also efficient and safe, Preformulation studies are required. During this phase of development, the chemist describes the Physico-chemical characteristics of the drug substances and how they interact with different formulation ingredients. Preformulation study objectives: To identify the critical Physico-chemical properties of a novel drug substance.

Preparation of Gel

Preparation of gel with Carbopol 934

Five different herbal hair gel formulations were created using the Carbopol 934 gel base and a straightforward gel formulation preparation method. Methyl paraben, propyl paraben, glycerin, polyethylene glycol (PEG), Carbopol 934, PVP, and triethanolamine are all ingredients in the gel formulation. 50 ml of distilled water were mixed with Carbopol 934 and the measured amount of extract while being continuously stirred at 1200 rpm in a magnetic stirrer for 30 minutes. Take 2 ml of glycerin and propylene glycol. And while stirring continuously, add Polyvinylpyrrolidone, Methylparaben, and Propylparaben in the appropriate amounts. Triethanolamine was added drop by drop to the mixture to neutralize it and bring the pH level to the desired range (6.8–7). A clear gel was created after more mixing was done. Finally, by adding, the volume was raised to 100 ml.

Quantitative composition of leaves extract gel formulation.

S. no.	Ingredients	F 1	F2	F 3	F 4	F 5
1	Herbal extract(g)	1	1	1	1	1
2	Carbopol 940(g)	1	1	2	2 .5	3
3	Glycerin(ml)	1	1 .5	2 .5	3	3 .5
4	Propyleneglycol(ml)	2	1 .5	2 .5	3 .0	3 .5
5	PVP(mg)	1	1	1	1	1
6	Propyl paraben(g)	1 .5	1 .0	1 .5	1 .0	1 .0

8	Triethanolamine(ml)	q . s + pH 6 .5 7	q . s + p H 6 .5 -7	q . s + p H6 .5 -7	q . s + p H 6 .5 -7	q . s + p H 6 5 -7
9	Distilled water(ml)	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0



Figure: Herbal gel formulation

Physicochemical evaluations Appearance/clarity:

The herbal gel formulations appearance/clarity, colour, odour, and presence of any suspended particulate matter were all carefully examined with the naked eye. By observing them against a black and white background, it was further evaluated.

Determination of pH

A digital pH meter was used to check the hair gel pH levels. The electrode was dipped in the gel formulation for 30 minutes until a constant reading was obtained after one gramme of gel had been dissolved in 25 ml of distilled water. Also observed was constant reading. Two copies of the pH measurements for each formulation were made (Herman *et. al.*, 2016)

Determination of Viscosity

Using a Brookfield Viscometer, the viscosity of the prepared gel was measured. The viscosity values were recorded as the gels were rotated at 100 revolutions perminute.

Spreadability

The parallel plate method, which is frequently used to measure and determine the Spreadability of semisolid preparations, was used to determine the Spreadability. Various formulations (1 g) were compressed between two horizontal plates measuring 20 20 cm and weighing 125 g on top. After one minute, the spread diameter was measured.

Bioadhesive Strength

The strength of the bioadhesive was determined using a glass slide and wooden block apparatus. The force necessary to separate the formulation from the

cellophane membrane is measured by the bio adhesive strength. 1 gm of prepared gel was placed on a glass slide and covered in cellophane. The glass slide provided intimate contact when it was placed on the fixed slide. To ensure close contact between the formulation and membrane, a two-minute contact time was allowed. Up until the slides came off the apparatus, weight was added to the pan. The formula was used to calculate the bio adhesive force, which was then expressed as the detachment stress in dyne/cm².

Extrudability

The collapsible aluminum tubes with standard caps were filled with the gel formulations, and the ends were crimped shut to seal. The tubes' weights were noted. The tubes were clamped after being positioned between two glass slides. The slides were covered with 500 gm, and the cap was then taken off. The extruded gel's volume was gathered and weighed.

Anti-fungal Activity

The therapeutic effectiveness of antifungal medications may be demonstrated by the inhibition of fungal growth under controlled conditions. The cup-plate method, which relies on drug diffusion from the gel contained in the cup through a solidified agar layer in the petridish to an extent such that growth of the added microorganism is completely prevented in a zone around the cup, was used to evaluate the microbiology of gels. (Mohsin et. al., 2017, Lanjewar et. al., 2020). A wider zone of inhibition is a sign that the drug is released from the base more effectively.

Test Media: *Dermatophyte agar*

Test Procedure

To determine the biological activity of the herbal hair gel formulation against fungi, antifungal studies were conducted. A Dermatophyte agar diffusion test using the "cup plate technique" and previously sterilized petri dishes was used to ascertain this (Vaishampayan *et.al.*, 2022). The test organism (*Candida albicans*) was previously seeded in the wells of a Dermatophyte agar plate using a solution of gel-prepared formulation and pure ketoconazole as a standard 1mg/ml. The plates were incubated at 28 c for 72 hours after allowing the solution to diffuse for 4 hours. Each cup's zone of inhibition was measured, and the results were compared to the standard.

Result and Discussions

The current study used Carbopol 934 as a gelling agent to increase the anti- dandruff activity of gel formulations. Physical appearance, pH, Spreadability, Viscosity, Homogeneity, Extrudability, and Antifungal activity were used to describe the prepared formulations.

In vitro evaluation parameters

S · no	F or m u l atio n	Physical Appearance	pH	Vi sco sity(C ps)	Spreada bility	Bio adhesivestrength (dyne/cm ²)

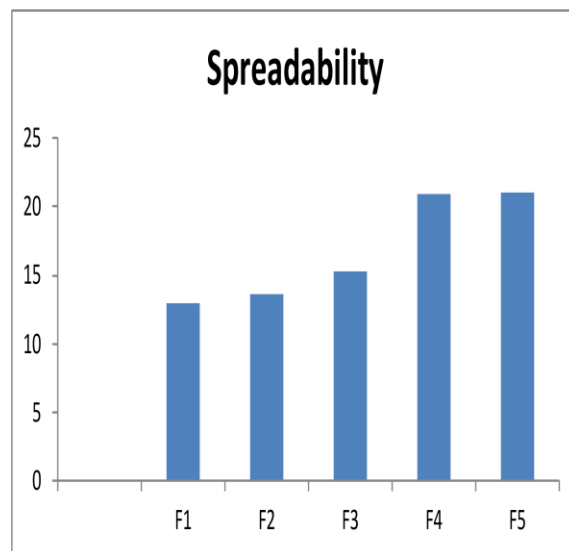
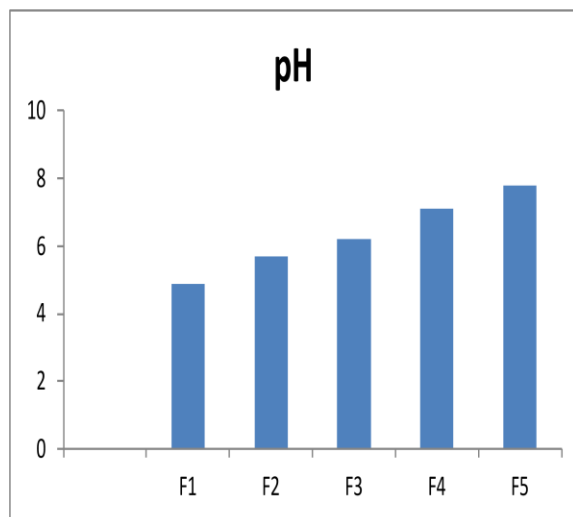
1	F 1	Yellowish	4 . 9	1100	1 2. 9 8	1274
2	F 2	Yellowish	5 . 7	2000	1 3. 6 7	1459
3	F 3	Yellowish	6 . 2	2809	1 5. 3 0	1590
4	F 4	Yellowish	7 . 1	3498	2 0. 9 0	1689
5	F 5	Yellowish	7 . 8	4092	2 1. 0 0	1750

In vitro evaluation parameters

S no	Formulations	Weight of An Empty collapsible tube (gm)	Weight of	Weight of the grams extruded	Extru dability ity (%)) a m o u nt
1	F1	13.00	22.9	13. 20	69 .9

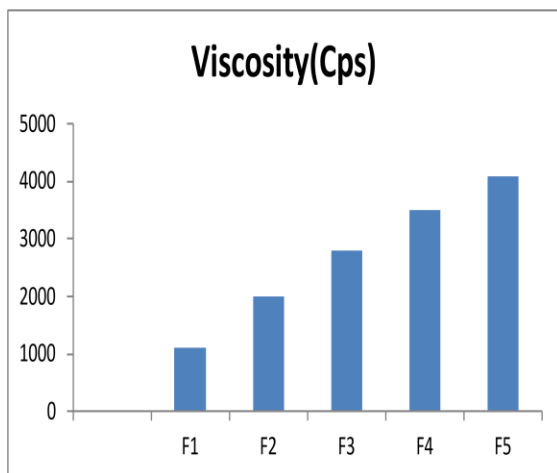
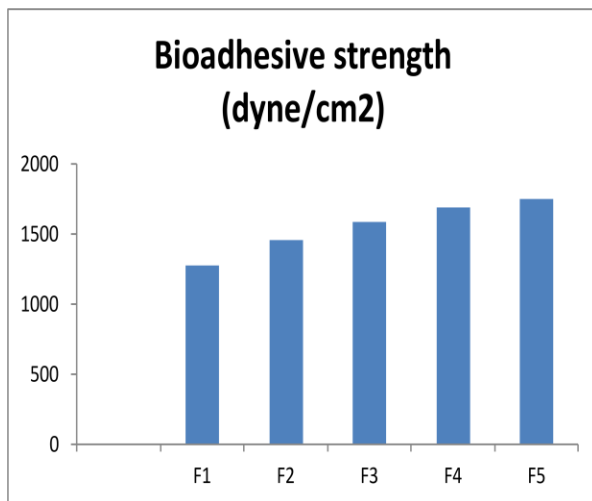
2	F23.00	22.9	14.89	73.3
3	F33.00	22.9	15.90	79.4
4	F43.00	22.9	17.43	80.7

5	F5	3.00	22.9	19.65	92.9
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pH of all formulations

Spreadability of all formulations



Bioadhesives of all formulations

Viscosity of all

formulations

In vitro Anti-Fungal study

Among all formulations, F5 showed better release and maximum zone of inhibition when compared to other formulations. Hence, Herbal Hair gel formulation F5 was considered as the best formulation.

Formulations	Zone of Inhibition s (mm)
F1	10mm
F2	15mm
F3	16mm
F4	18mm
F5	21mm

CONCLUSION:

Herbal formulations have been greatly improved for primary health care and are in increasing demand in the global market, especially in India, and are more accepted on the premise that they are safer than synthetic formulations. To establish herbal hair gels is a very good attempt. The formulation was formulated with water-soluble leaf extracts extracted from fenugreek, neem, and hibiscus leaves. These plants have been reported in the literature to have excellent antidandruff, antibacterial, and antioxidant activities.

All the formulations were evaluated by determining various parameters like Physical appearance, pH, Rheological studies, Spreadability, Extrudability and Anti fungal activity etc. However, from the above mentioned results it can be concluded that the herbal hair gel formulation F5 was suitable for application and it shows good results. Formulation F5 with showed the highest percentage of good spreadability, extrudability, rheological properties and anti fungal activity.

REFERENCES:

- Herman, A.; Herman, A.P. Mechanism of action of herbs and their active constituents used in hair loss treatment. *Fitoterapia* 2016, 114, 18–25
- Intiaz, F.; Islam, M.; Saeed, H.; Saleem, B.; Asghar, M.; Saleem, Z. Impact of *Trigonella foenum-graecum* Leaves Extract on Mice Hair Growth. *Pak. J. Zool.* 2017, 49, 1405–1412.
- Jadhav vd, formulation and evaluation of herbal gel containing leaf extract of *tridaxprocumbens*, *journal of pharmaceutical and biosciences*, 2015; 3(2015): 65-72.
- Jain, P.; Das, D.; Jain, P.; Jain, P. Pharmacognostic and Pharmacological Aspect of *Bacopa Monnieri*: A Review. *Int. J. Pharm. Pharm. Sci.* 2016, 4, 7–11.
- Lanjewar, A.; Maurya, S.; Sharma, D.; Gaur, A. Review on Hair Problem and its Solution. *J. Drug Deliv. Ther.* 2020, 10, 322–329
- Maderson PF, Mammalian skin evolution: a reevaluation, *Exp Dermatol*, 2003;12(3): 233–236.
- Mohsin j. Jamadar, preparation, and evaluation of herbal gel formulation, *sgv journal of pharmaceutical research & education*, 2017; 1(2): 201-224
- Patel rp, patel hh and baria ah”, formulation and evaluation of carbopol gel containing liposomes of ketoconazole”, *ijddt*, 2009; 1(2): 42-45.
- Qazi Majaz A, Molvi Khurshid I, *Herbal Medicine: A Comprehensive Review*, *International Journal of Pharmaceutical Research*, 2016; 8 (2).
- Salim, S.; Kamalasanan, K. Controlled drug delivery for alopecia: A review. *J. Control. Release* 2020, 325, 84–99
- Vaishampayan, P.; Rane, M.M. Herbal nano cosmeceuticals: A review oncosmeceutical innovation. *J. Cosmet. Dermatol.* 2022