WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 12, 1014-1024. Research Article ISSN 2277– 7105

FORMULATION AND EVALUATION OF HERBAL HAIR OIL USING GUAVA LEAVES

Payal Pilaji*[1], Priyanka Machigar[2], Vedika Mhatre[3], Aishwarya More[4], Kavish Pagaria[5], Saurabh Pandey[6] and Sahil Patil[7]

St. Wilfred's Institute of Pharmacy; Panvel Nr. Shedung Toll Plaza, Old Mumbai – Pune Highway, Panvel, Navi Mumbai, Maharashtra 410206.

Article Received on
26 May 2023,

Revised on 16 June 2023,
Accepted on 06 July 2023

DOI: 10.20959/wjpr202312-28985

***Corresponding Author**
Prof. Payal Pilaji
St. Wilfred's Institute of Pharmacy; Panvel Nr. Shedung Toll Plaza, Old Mumbai - PuneHighway, Panvel, Navi Mumbai, Maharashtra 410206.

ABSTRACT

Malassezia furfur is the fungus that causes dandruff. To prevent this dandruff, there are many herbal oils and herbal shampoos available on the market. The research paper is all about the formulation and evaluation of herbal oils made from plant materials such as camphor, almond oil, coconut oil, fenugreek, aloevera pulp, jasmine, and guava leaves. The study's primary objective was to treat hair issues such as dandruff, improve scalp blood circulation, and promote natural hair growth by maintaining the normal function of the sebaceous gland. Herbal oil is also used to prevent dandruff and split ends. The herbal oil formulation assessed a number of parameters, such as saponification, pH, acid value, and other elements. Herbal hair oil formulations are natural; they do not have any other side effects as compared to synthetic oil. A primary skin irritability test was carried out to check the irritability of oil. Camphor acts as an antibacterial and antidandruff agent and is also good for improving blood circulation. In this research, we have mixed camphor with coconut oil, and when we massage it on the scalp, it removes excessive dryness and controls dandruff. The oil was prepared according to the Ayurvedic pharmacopoeia.

KEYWORDS: Camphor, Herbal oil, Dandruff, Guava leaves.

INTRODUCTION

The theory of elegance and cosmetics is as old as humanity. Products that have medicinal constituents make people look beautiful and young. The medicinal herbs of India and their purposes are popular throughout the world. Herbal extracts, as the name implies, are extracts

from herbs. Its roots were found in the revered Vedas and in Unani cultures, making it an ancient approach. "Hair tonics" are hair oils that are contained in herbal medicines.[8] The skin of the scalp has a number of distinctive characteristics that contribute to its crucial function in protecting the head.[2] Pityriasis capitis, also known as seborrheic dermatitis limited to the scalp, is a condition that has been present for a while despite the fact that there are several treatments available.[1] A common scalp condition that affects many people is dandruff. It has an impact on people of all ages, including children, adolescents, and adults.

It resembles little white or gray flakes that gather unevenly across the scalp. Individual differences exist in the severity, frequency, and duration of dandruff symptoms. It is a chronic illness, and its signs and symptoms might change over time. The scalp's skin may itch and flake as a result of the symptoms. People with oily or greasy hair tend to experience these sensations more frequently. Skin flakes may appear on the hair and might be grey or yellowish. Additionally, there could be recurrent infections of the skin on the face, hair loss, acne, pimples, and scalp redness.[3] For hair treatments, a combination of botanical ingredients has been employed. Aloe vera pulp, Tulsi, Hibiscus, Guava Leaves, Coconut oil, Almond oil, and Methi are a few of these botanicals.[8]

Role of herbs in Herbal hair oil

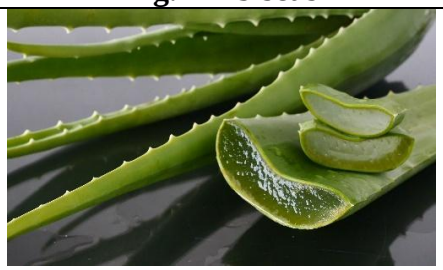
- Coconut oil nourishes the scalp and improves the gloss of the hair.
- Almond oil is used to thicken hair and prevent hair loss since it is high in vitamin E.
- Tulsi is a potent treatment for hair loss. It is a crucial component of natural remedies for hair loss. The plant reduces hair loss by preventing bacterial and fungal infections and strengthening the hair roots.
- Hibiscus blossoms are used to stop hair from prematurely graying, stop hair loss, and stop split ends.
- Guava leaves are excellent for boosting hair development whether applied topically as a hair rinse, hair serum, hair pack, and hair oil, as well as when ingested internally as a tea. It cures practically all hair issues, such as dandruff, inflamed scalp, and infected scalp, that cause hair loss.
- Jasmine flowers offer the oil a pleasant aroma as well as acting as a conditioning and antibacterial agent.
- Fenugreek prevents hair loss and fortifies hair follicles from root to tip.

- The pulp of aloe vera plants contains proteolytic enzymes that help the scalp's dead skin cells heal. It also works well as a conditioner and makes your hair lustrous and smooth. It promotes hair development, stops scalp itchiness, lessens dandruff, and conditions hair.[8]

MATERIALS AND METHODS

To make herbal hair oil, a variety of plant ingredients were gathered. Aloe vera pulp, tulsi powder, hibiscus powder, guava leaf powder, almond oil, fenugreek seeds, camphor, jasmine oil, and coconut oil were obtained from the neighborhood market in Kharghar, Maharastra, India.

Table 1: Ingredients and Uses.

Sr.no	Ingredient	Use of ingredient	Pictures
1	Fenugreek seeds	Strengthens hair from root to tip	 **Fig.1 Fenugreek seeds**
2	Hibiscus	Prevent hair loss and spilt ends	 **Fig.2 Hibiscus**
3	AloeVera pulp	Reduces dandruff and conditions your hair	 **Fig.3 Aloe Vera**
4	Tulsi	Prevent bacterial and fungal infections.	 **Fig.4 Tulsi Leaves**

5	Guava Leaves	Antidandruff agent	 **Fig.5 Guava Leaves**
6	Almond oil	Treat hair loss	 **Fig.6 Almond oil**
7	Coconut Oil	Scalp nourishment and shine to the hairs	 **Fig.7 Coconut oil**
8	Camphor	Antibacterial, Antidandruff, improve blood circulation	 **Fig.8 Camphor**
9	Jasmine oil	Mild fragrance	 **Fig.9 Jasmine**

Method of preparation

Tulsi powder, hibiscus powder, aloe vera pulp, and guava leaf powder were among the components that were precisely weighed and added to the beaker. The seeds of fenugreek and

camphor were precisely weighed, ground in a mortar and pestle, sieved, and added to the beaker. Afterwards, combine 6.5 ml of coconut oil with 15 ml of almond oil. then boil the solution for 15 minutes. After boiling, a muslin cloth was used to filter the solution. After that, add 100 ml of coconut oil to the volume. For aroma, add 2–3 drops of jasmine oil. Store it in an amber-colored container at last.[16,17]

Table 2: Formulation.

INGREDIENT	QUANTITY
Methi seeds	1.25gm
Tulsi powder	0.5gm
Guava leaves	0.3gm
AloVera pulp	1gm
Hibiscus powder	0.25gm
Almond oil	15ml
Coconut oil	6.5ml
Camphor	0.5gm
Jasmine	0.25ml

Evaluation of Herbal Hair Oil Preparation

Sensitivity test

The prepared herbal hair oil was applied to 1 centimeter of hand skin and left to dry for 4-5 minutes.[18]

Acid value

Preparation of 0.1 molar solutions

0.56 g KOH pellets were weighed and dissolved in 100 ml of distilled water while being constantly agitated. The burette was filled with the prepared 0.1 molar KOH solution.[19]

Preparation of sample

10 mL of oil was measured, dissolved in 50 mL of a 1:1 methanol/diethyl ether mixture, and vigorously shacked. The solution was titrated with 0.1 molar KOH solutions after 1 ml of phenolphthalein solution was added.[24]

Saponification value

In a 250-ml conical flask, 1 ml of oil and 10 ml of the methanol:diethyl ether combination (2:1) were added. To this, 25 ml of 0.5 N alcoholic KOH was added, and the flask was allowed to cool for 30 minutes. Using phenolphthalein indicators, this solution was titrated against 0.5 N HCl. Similarly, no oil (sample) was used in the blank titration.[21,22]

Amount of KOH in mg used was calculated using formula.

Saponification Value = 56.1(B-S) N/W

Where,

B= Volume in mL of standard Hydrochloric acid required for the blank.

S= Volume in mL of standard Hydrochloric acid required for the sample.

N= Normality of standard Hydrochloric acid.

W= Weight of the oil taken in gms for the test.[23]

Fig. 10 Acid Value

Fig. 11 Saponification value for sample

Fig. 12 Saponification value for blank

Microbial strains

The following microbes were used in the study.

a. E.coli MTCC443 (Gram –ve)

b. S.aureus MTCC 96 (Gram +ve)

Zone Of Inhibition

A microbiological research was conducted on a prepared extract of guava leaves. Bacterial subcultures were introduced to sterilized nutrient agar medium and thoroughly agitated to ensure equal distribution of organisms throughout the media (5 x 105 cfu/ml). This agar media was spread in equal quantities in sterile petri dishes, with each petri dish containing around 45-50 mL of the medium. After that, the medium was allowed to harden. Cups were created by punching through a package of agar media with a sterile cork borer (6 mm diameter). To allow the drug to spread in the agar matrix, a prepared extract of Guava leaves was poured into the bored cavities and stored in a cold environment. It was then incubated for 24 hours at 370°C. Using sliding calipers or a ruler, the diameter of the zones of total

inhibition (as evaluated by the unaided eye) was measured in mm. The zone of inhibition was calculated by subtracting the diameter of the drilled cups from the total measurement.

Microbial Evaluation of Prepared extract of Guava leaves

The diameter of the zones of complete inhibition (as determined by the naked eye) was measured in mm, including the diameter of the cups drilled, and is afterwards subtracted from the total measure. Zones were measured to the nearest full millimeter with sliding callipers or a ruler held on the back of an inverted petri plate.

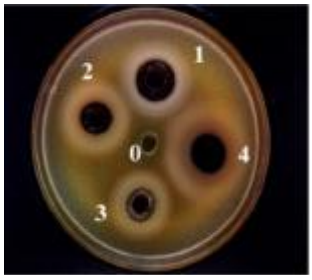
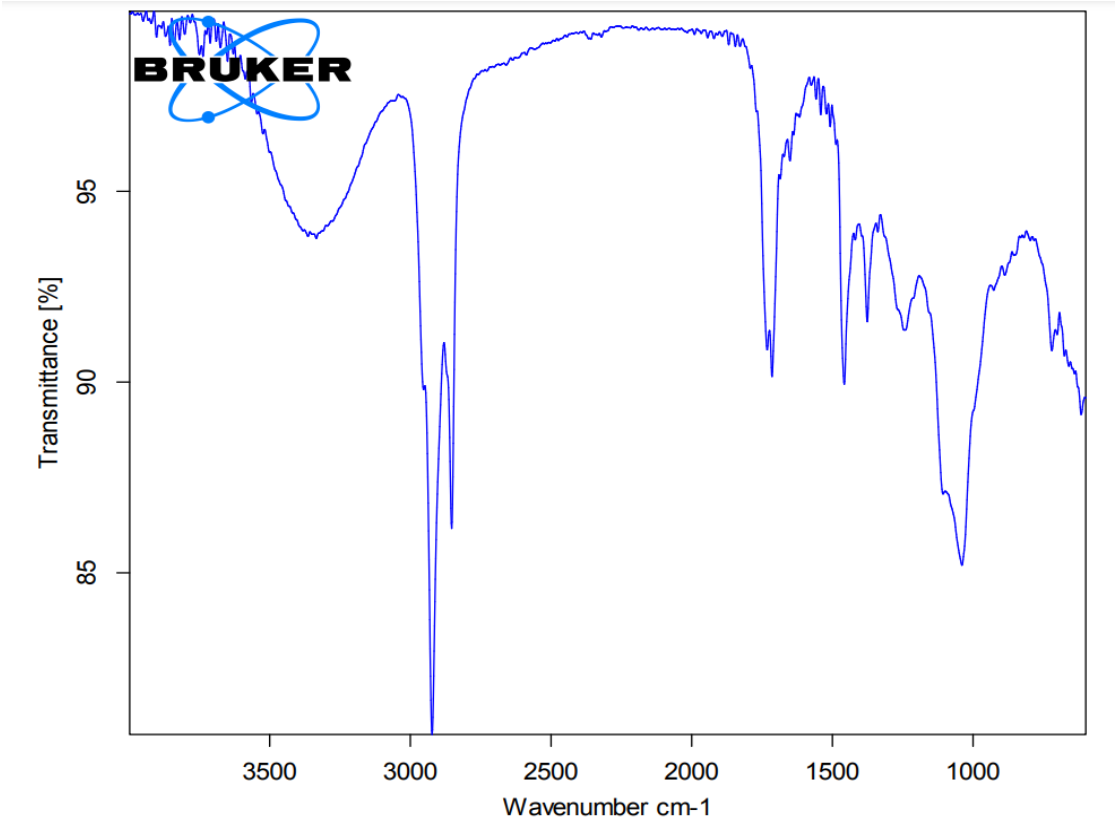


Fig. 13: Antimicrobial activity of prepared extract of Guava leaves.

IR of Quercetin



Wavenumber	Abs. intensity	Rel. intensity	Width	Found if threshold <	Shoulder
3334.2644	0.938	0.045	337.2444	19.900364	0
2922.6864	0.808	0.187	68.3250	97.980240	0
2853.2474	0.862	0.052	13.9977	25.705832	0
1731.8823	0.908	0.007	8.8484	2.726278	0
1714.5408	0.901	0.082	53.3156	41.490685	0
1457.7743	0.899	0.052	28.4457	23.475220	0
1376.2087	0.916	0.027	17.5399	13.596558	0
1245.8536	0.914	0.021	212.5376	7.507528	0
1039.6581	0.852	0.096	150.2166	46.215664	0
720.0568	0.908	0.015	102.0094	5.273459	0
615.9081	0.891	0.007	7.7142	2.344319	0

RESULTS AND DISCUSSION

Table 3: Evaluation of Herbal Antidandruff hair oil.

Sr. No	Evaluation parameter	Inference
1	Saponification value	112.2
2	Acid value	1.122
3	Sensitivity Test	Non sensitive
4	Irritation Test	Non Irritant
5	Colour	Yellowish Brown
6	Odour	Aromatic
7	Grittiness	Smooth

Table 4: Zone of Inhibition of Prepared extract of Guava leaves.

extract of Guava leaves	Gram Positive	Gram Negative
Conc. (mg/ml)	***Staphylococcus aureus***	***Escherichia coli***
10 (1)	1.77±1.32	1.76±0.56
25 (2)	8.23±0.57	7.67±1.28
50 (3)	12.75±0.64	10.97±0.72
Blank (0)	0	0
Std. (Ciprofloxacin) (4)	13.67±0.56	12.78±0.82

Values are expressed as mean ± SEM (n=3).

Table 5: Interpretation of IR.

Name of constituents	IR (cm^{-1})
Quercetin	**3334.26 (-OH str.); 2952.68 (Ar-CH str.); 2853.24 (-CH3 str.); 1731.88 (-C=O str.); 1245.85 (-C=C bend); 1039.65 (-C-O-C str.)**

Dandruff is a scalp condition that affects more than 50% of the human population and affects the social behaviour of the sufferer along with possessing an unhealthy scalp, and for treating them use of herbal products are the best. The herbal based oils are known for their non-toxic nature. It nourishes the skin of the scalp as well that as hair. Herbal oil is one of the most well recognized hair treatments. The use of different herbal materials which is having different

benefits with good combination will give the great effect for hair. The herbal extracts and constituents chosen for the formulation of hair oil were reported to have hair growth, relaxation, anti-dandruff, hair thickening, and hair fall control properties, which when used together elicited a synergistic effect in promoting healthy and shiny hair growth.

CONCLUSION

The result shows that Guava Leaves extract showed antimicrobial activity. India is part of a growing range of medicinal herbs with a variety of curative properties. Herbal formulations are fulfilling the needs of the growing world market. Herbal oil are non toxic in nature. It nourishes the skin of the scalp as well as hair.

ACKNOWLEDGEMENT

Authors are thankful to Prof. Payal Pilaji, Department of Pharmaceutical Chemistry, St. Wilfreds Institute of Pharmacy, Panvel for your guidance motivation and unconditional support for this work and we are thankful to Sanjivani College of Pharmaceutical Education & Research, Singnapur, Masharashtra for providing the antimicrobial and IR result.

REFERENCES

1. A. Sreedhar, R. Mallya and M. Apte. DEVELOPMENT AND CHARACTERIZATION OF ANTI-DANDRUFF NIOSOMAL HAIR GEL CONTAINING TEA TREE OIL. International Journal of Pharmaceutical Sciences And Research, 2020; 11(1): 91-103.
2. M. Narshana and P. Ravikumar. AN OVERVIEW OF DANDRUFF AND NOVEL FORMULATIONS AS A TREATMENT STRATEGY. International Journal of Pharmaceutical Sciences And Research, 2018; 9(2): 417- 431.
3. Baby Ganeriwala, R. R. Hiremath, U. B. Bolmal and K. S. Gudaganatti. DEVELOPMENT OF AMRABEJAADI ANTIDANDRUFF CREAM - AN AYURVEDIC FORMULATION. International Journal of Pharmaceutical Sciences And Research, 2015; 6(6): 2601-2609.
4. Yasmeen Ahmed, S. Shakir Jamil, Ayshah Hashimi, Mantasha Binth Siraj and Umar Jahangir. N OLD ADAGE MANAGEMENT PERSPECTIVE FOR DANDRUFF. International Journal of Pharmaceutical Sciences And Research, 2020; 11(6): 2557-2565.
5. Mrs. K.Sravanthi, N.Kavitha, K.Sowmya, S. Naazneen, U.Vaishnavi, CH. Anil. A Review on Formulation and Evaluation of Herbal Anti-Dandruff Shampoo. International Journal of Pharmaceutical Research and Applications, 2021; 6(3): 1300-1311.

6. Mrs. Aswathy.c, Farshana Parvine, Jamsheeda.V, Shahina.K, Subeena, Mr. Ajith Chandran. Preparation and Evaluation of Polyherbal Hair Oil: An Effective Cosmetic. International Journal of Pharmaceutical Research and Applications, 2022; 7(4): 264-270.
7. Harshali Wadekar, Rizwan Thara. Preparation and Evaluation of Herbal Hair Oil. International Journal of Science and Research (IJSR), 2020; 9(11).
8. Pawan Maurya, Om Prakash Maurya and Shashikant Maury. DEVELOPMENT AND CHARACTERIZATION OF HERBAL ANTIDANDRUFF HAIR OIL. World Journal of Pharmaceutical Research, 2022; 11(6): 292-297.
9. Shubham Singh and Shashikant Maury. FORMULATION AND EVALUATION OF POLYHERBAL ANTIDANDRUFF POWDER SHAMPOO USING POMEGRANATE SEED AND GUAVA LEAVE. World Journal of Pharmaceutical Research, 2022; 11(6): 276-291.
10. Pavan S, Prathibha C, Dr. Kavitha PN, Dr. Saraswathi CD. Formulation and Evaluation of herbal hair oil. International Journal of Pharmaceutical Research and Applications, 2021; 6(5): 1285-1299.
11. Mr. Shrikant M. Madhekar, Mrs. Surekha S. Tayade, Ms. Vaishali N. Tidke, Mrs. Renuka G. Pawar, Mr. Akshay R. Gadhari. FORMULATION AND EVALUATION OF POLY-HERBAL ANTI-DANDRUFF HAIR OIL: A HAIR CARE PREPARATION. Journal of Emerging Technologies and Innovative Research (JETIR), 2021; 8(4).
12. Arote Rushikesh T and Prof. Bhalekar Sachin M. Preparation and Evaluation of Herbal Anti Dandruff Shampoo. International Journal of Advanced Research in Science, Communication and Technology, 2022; 2(1).
13. Anuradha G More, Priyanka D Pote, Padmaja S Kore, Yogish D Garhwani. Formulation and Evaluation of Polyherbal Anti-Dandruff Shampoo. International Journal of Ayurvedic Medicine, 2022; 13(2): 365-369.
14. P. Vinod Kumar, P. Venkateswara Rao, R.Prince, K.Terejamma, T.Chaitanya, Prasanna Kumar Desu. Formulation and Evaluation of Herbal Anti-Dandruff Shampoo from Bhringraj Leaves. ARC Journal of Pharmaceutical Sciences (AJPS), 2018; 4(2): 29-33.
15. B. Ramya Kuber, Ch. Lavanya, Ch.Naga Haritha, S. Preethi, G. Rosa. Preparation and evaluation of poly herbal hair oil. Journal of Drug Delivery and Therapeutics, 2019; 9(1): 68-73.
16. Bhatia, S.C. Perfumes, soaps, detergents and cosmetics, 2021; 639: 641.

17. Banerjee, P.S., Sharma, M., Nema, R.K. Preparation, evaluation and hair growth stimulating activity of herbal hair oil. Journal of Chemical and Pharmaceutical Research, 2009; 1(1): 261-267.
18. Mithal, B.M., Shah, R.N. A Hand Book of Cosmetics. 1st Edition, 2000; 141-142.
19. Singh, R.M. Indian Pharmacopoeia. Government of India, Ministry of Health and Family Welfare, Published by, The Controller of Publication, Edition, 1996; II.
20. Kokate C.K, Purohit A. P, Gokhale S. B. Pharmacognosy, Nirali Publications, 2008.
21. Indian Pharmacopeia, 2007.
22. Pharmacognosy and Phytochemistry Volume 1, Third Edition by Vinod Rangari, Career Publication.
23. X. Fatima Grace, S. Rahul Raj, S. Shanmughanthan, D. Chamundeeshwari. Preparation and Evaluation Poly herbal hair oil, International Journal Of Pharmaceutical Chemistry and Analysis.
24. LipiPurwal, Surya Prakash B.N Gupta and Milind. S. Pande. Development and Evaluation Of herbal formulation for hair growth, E-Journal of Chemistry, 2008; 5(1): 34-38.