Design and Evaluation of Herbal Syrup for Fatty Liver Management

SANSKRITI[1], LUSHI KUMARI[1,] LUXMI YEASMIN[2]

[1] Research Scholar, School of Pharmacy & Research Dev Bhoomi Uttarakhand University, Dehradun, Uttarakhand, India
[2]Assitant Professor, School of Pharmacy & Research Dev Bhoomi Uttarakhand University, Dehradun, Uttarakhand, India
*corresponding author:sopr.luxmi@dbuu.ac.in.
ORCID ID: -0009-006-94427823

ABSTRACT

Liver remains one of the leading health challenges worldwide, with high mortality rates and many unmet clinical needs. Although modern treatments offer a wide range of effective options, current liver therapies often face limitations such as drug resistance, adverse side effects, and poor selectivity. Therefore, the development of novel and highly specific agents is crucial to improve the outcomes of fatty liver anti-inflammation. Carica papaya &hibiscus petals derivatives, known for their valuable pharmacological properties, have shown significant promise in liver treatment. However, further research and optimization are needed to enhance their activity and selectivity. This study aims to address the limitations of exist seed &petals by synthesizing new compounds and evaluating their fatty liver potential. The findings could lead to the development of more targeted and effective Carica & Hibiscus-based liver therapies. The findings from indicate that the prepared herbal formulations.[1]

Key words: liver, syrup, anti-inflammation, seeds, petals**.**

INTRODUCTION

Herbal Syrup is defined as a formulation prepared by combining and concentrating a decoction with sweeteners like stevia sugar, or other additives, during decoction, herbal are boiled in water to extract active constituent. As the water evaporates, the extract becomes more concentrated, increasing viscosity, adding of starch & addition of sweeteners like stevia during boiling which naturally thicken the liquid. Many of them herbs release mucilage, gums or starch during boiling, this process help extend the shelf life of formulation. Additionally, the added sweeteners enhance the taste of certain herbs, making the final syrup both palatable and effective. Public interest in traditional medicines has grown in recent years; however, to enhance patient acceptance, traditional herbal remedies need to be transformed into modern medicinal forms.[20]

Drug syrup can be prepared using aqueous extract along with various solvents. Among these, water is the most accessible, cost-effective, and safe solvent. Common extraction techniques for obtaining the extract include decoction, infusion, maceration, percolation, and Decoction is considered a simple and rapid method, often used as a standard extraction technique. In this method, the temperature may reach up to 90°c; however, prolonged exposure to high heat can degrade the natural active compounds. [19] Decoction typically involves a specialized two-part pot system: the upper pot holds the plant material, which is immersed in the lower pot containing water and heated over a flame. This setup helps prevent the plant powder from directly boiling or being exposed to excessive heat.

OBJECTIVES:

- To authenticate the botanical identity of *carica papaya* seeds and *hibiscus rosa-sinensis* petals using macroscopic, microscopic, and/ or molecular methods.
- To prepare and characterize extracts from *carica papaya seeds and hibiscus rosa-sinensis* petals.
- To quantify the total polyphenol and flavonoids contents of the prepared extracts.
- To evaluate the stability of the extracts under different storage or environmental conditions.[1]

Statement of the problem:

Liver remains one of the leading health challenges worldwide, with high mortality rates and many unmet clinical needs. Although modern treatments offer a wide range of effective options, current liver therapies often face limitations such as drug resistance, adverse side effects, and poor selectivity. Therefore, the development of novel and highly specific agents is crucial to improve the outcomes of fatty liver anti-inflammation. Carica & Hibiscus derivatives, known for their valuable pharmacological properties, have shown significant promise in liver treatment. However, further research and optimization are needed to enhance their activity and selectivity. This study aims to address the limitations of existing Carica seed & Hibiscus petals by synthesizing new compounds and evaluating their fatty liver potential. The findings could lead to the development of more targeted and effective plant seed &petals -based liver therapies.[1]

Significance of the study:

Research focused on the development and improvement of syrup of Carica seed & Hibiscus derivatives for fatty liver purposes holds significant importance in the ongoing global fight against liver. Despite continuous efforts by researchers and haematology, liver remains a leading cause of death worldwide, and current treatments are still limited by challenges such as drug resistance, lack of selectivity, and adverse side effects. Enhancing existing fatty liver drugs and designing more targeted, effective therapies is a key objective in creating clinically relevant treatments. Carica & Hibiscus -based compounds have shown promising activity by targeting cell membranes, This study aims to investigate the potential of seed &petals

derivatives in advancing new and more effective liver therapies. Ultimately, this research could contribute to the development of novel seed &petal syrup -based treatments, offering improved options in the ongoing effort to advance liver care.[1]

Research methodology:

Preparation of syrup using decoction extract.

Sr.No	Ingredient	Quantity	Activity
1.	Hibiscus	10 gram	Antimicrobial**,** Antioxidant, Anti-inflammatory
2.	Carica papaya	5 gram	Anti-inflammatory, Wound healing,
3.	Sorbitol	50 ml	Humectants, Laxative,**T**exturizer
4.	Zantham gum	0.5	Stabilizer, Binder, Suspending agent,
5.	Stevia	0.2	Antihyperglycemic**,** Antioxidant**,** Natural sweetener.
6.	Sodium benzoate	2.0	Preservative,Antimicrobial,
7	glycerine	10 ml	Emollient **,**Skin protectant,Solvent.
8.	Distilled water	Make up vol 100	Diluent, Purity,Solvent.

Carica papaya seed & Hibiscus petal were collected in December 2024in Kanswali, Bhauwala dbuu, Dehradun, the seeds were washed and petals were clean and placed in room temperature with air circulation at 30 C to dry for15, 20 days. [20]The dried sheds &petals (30 g, 60 gm) were finely milled and submitted to an extraction with water by decoction at 80 C for 15 min (1/10 plant/solvent). After cooling, the filtered extract was kept in fridge.To prepare the final herbal syrup, 10 grams of hibiscus petal decoction and either 5 grams of *Carica* seed or 0.2 grams of stevia decoction were added. A preservative was then mixed in gradually with continuous side-by-side stirring. The resulting herbal syrup was subsequently subjected to evaluation. Solubility of the syrup was assessed by visually observing the clarity of the solution.[19]

Chemical reagents:

Flavonoids, polyphenolic, was obtained from selquet testing &research laboratory pvt. LTD. (Government research roorkee U.K.). Gallic acid, ellagic acid, and the positive controls used in / microssome assay: 2- nitrofluorene, sodium azide, 2-aminofluorene, 9-aminoacridine, and cumene hydroperoxide were purchased from Sigma–Aldrich (St. Louis, MO, USA). All other reagents and solvents were of analytical grade. [18]

Phytochemical Screening:

Syrup was subjected to qualitative chemical screening according to methodology described by DR R.P. SHARMA et al. (2024) and SUSIL KUMAR (2024). The method consistsof

HPLC &GC reactions for qualitative detection of flavonoids, tannins, anthraquinones, alkaloids, saponins, coumarins and cardiac glycosides. The high performance liquid chromatography analyses were performed following systems and developers indicated by (SushiKumarAgrawal,DR.R.P. SHARMA 2000-2024). Total phenols and flavonoids were measured according to the Folin–Ciocalteu method as in The British Pharmacopoeia (2010), and the quantification of flavonoids contents was performed using the methodology.[18]

Preparation of Decoction:

The initial step in studying medicinal plants involves preparing the plant samples to preserve their bioactive compounds before extraction. Samples such as seeds and flowers can be processed either fresh or dried. Techniques like drying and grinding affect the retention of phytochemicals in the final extract. In this procedure, 15 grams of the crude herbal material were accurately weighed and mixed with 100 ml of water. A reflux condenser was then attached, and the mixture was gently heated in a water bath for 30 minutes. The boiling continued until the volume was reduced to one-fourth of the original. Afterward, the decoction was cooled, filtered, and the resulting filtrate was used for the preparation of the final syrup.[18]

Evaluation parameter likes:

a. Organolaptic ;

formulation	colour	odour	taste
A	Deep ruby red	Floral and slightly fruity.	Tart and tangy
B	Dark magenta	Refreshing floral.	Sour and fruity
C	Bright crimson	Mild floral.	Sour and fruity

b. Physical parameter:

Parameter	**Result**	**Limits**	**Protocol**
Flavonoids	present	present	IHS
Shinoda test	present	present	IHS
Polyphenolic content	present	present	IHS
pH	6.8	6.0-8.0	IHS
Color	Red	----------	IHS
Stability test	Complies	complies	IHS

c. Physicochemical parameter.

PhysicochemicalParameter			IHS
Turbidity (at 72 hr)	Passes the test	passes the test	IHS
Homogeneity (24hr)	Passes the test	passes the test	IHS
Turbidity(36hr)	Passes the test	passes the test	IHS
Homogeneity (36 hr)	Passes the test	passes the test	IHS
Turbidity (36 hr)	Passes the test	Passes the test	IHS
Homogeneity (At72 hr)	Pass the test	Pass the test	ISH
Total microbial count	36.0cfu/gm	NMT-100cfu/gm	HIS.

D . Microbial test:

Sr.no	**PARAMETER**	**RESULT**	**LIMIT**	**PROTOCOL**
1.	Pathogens	Absents/gm	absent	IHS
2.	Microbial count	36.0cfu/gm	NMT-100cuu/gm	IHS
3.	Total yeast & mould	LT10.0cfu/gm	NMT-10cfu/gm	IHS
4.	E.coli	Absent /gm	absent	IHS
5.	P.aeruginosa	Absent /gm	absent	IHS
6.	S.aureus	Absent /gm	absent	IHS
7.	Candida albicans	Absent /gm	absent	IHS
8.	polyphenolic content	present	present	IHS
9.	Shinoda test	present	present	IHS

Stability Testing:

Stability testing of the formulated herbal syrup was conducted under accelerated temperature conditions.

↓

9 samples of batches A, B, and C (stored at **4°C**, **room temperature**, and **47°C** respectively)

↓

Sample evaluated for

1. Physicochemical parameters
2. Turbidity
3. Homogeneity

Time intervals of **24, 48, and 72 hours** to monitor for any changes.

Results and Discussion:

The findings from this study indicate that the prepared herbal formulations . The ingredients used in the herbal liver syrup were selected based on their **documented therapeutic properties**, contributing to both the **prevention and treatment** of fatty liver. All formulations met the required **physical evaluation parameters** and demonstrated **significant anti-inflamattion effects**. A number of case studies have shown that a carica seed & hibiscus petals derivatives with just minor structural changes might provided an effective flavonoids and polyphenolic with anti-inflammation effect that study shown that the present of all above mention parameters and microbial test absent has Cleary claimed to be treated fatty liver disease.

REFERENCES

1. Kumar M, Choudhary R, Yeasmin L, Singh S, Mishra KL, Singh AD, Kumari A, Sundriyal A. A Study on Synthesis of Azole Derivatives Optimized for Anticancer Activity. J Neonatal Surg [Internet]. 2025May13 [cited 2025May31];14(21S):1456-62.
2. V.M. Jadhav, R.M Thorat, V.J. Kadam 7 N.S. Sathe. HIBISCUS ROSA SINENSIS LINN- RUDRAPUSPA: AREVIEW; Journal of Pharmacy Research ;2009, 2(7), 1168-1173. Ameer Fawad Zahoor Iftikhar Hussain
3. V. M .JADHAV, R.M. Thorat, V.J. Kadam and N.S. Sathe; TADITIONAL MEDICINIAL USES OF HIBISCUS ROSA-SINENSIS; J, PHARMA RES ,2009;2(8):1220-1222.
4. XI CHEN,PROTECTIVE EFFECTS OF QUERCETIN ON LIVER INJURY INDUCE BY ETHANOL. A REVIEW journal of pubmed central 2010,apr;6(22):135.
5. Camelia Munteanu, The effect of bioactive Aliment Compounds and micronutrients on Non-Alcoholic Fatty Liver Disease.Areview paper of pubmed central,2023Apr;12 ,4:903.
6. Sergey Gorialnov,Study of the chemical composition of carica papaya.seed oils of various geographic origins, Areview paper Of MDPI,2023NOV;*et al.*,VOL 9,ISSU11.
7. Ceyda sible kilic,Fatty acid composion of *hibiscus trionum l.20100c* et al.,*t;5:1.,6569*
8. Mohd. Afsahul Kalam, Barjes Jalal, Urzeeba Zahoor& Ansar Ahmed. GURHAL (HIBISCUS ROSA- SINENSIS): MEDICINAL IMPORTANCE IN PERSPECTIVE OF UNANI MEDICINE AND PHARMACOLOGICAL STUDIES. European Journal of Pharmaceutical and Medical Research,2024; 11(4) 322-329.
9. Catiele Antunes, Mohammadreza Azadfard, Gilles J. Hoilat, Mohit Gupta. FATTY LIVER. Cleveland clinic foundation 2023.
10. Y.M. Li, Su, H.Q. Yang, X.P. Bai, Q.X. Zhu, H.X. Liu and J.Q.Li THE EXTRACT OF CARICA PAPAYA SEED OIL. Advance Journal of Food Science and Technology 2015 ,7(10): 773-779.

11. U.A. Essiett, E.S. Iwok; floral and leaf anatomy of Hibiscus species; American journal of medical and biological Research, 2024; 2(5); 102-117
12. Subhashini Shandilya and Vandan Pathak, CHEMICAL CONSTITUENTS7 PHARMACOLOGICAL EFFECTS OF HIBISCUS ROSA – SINENSIS (CHINA ROSE) World Journal of Pharmaceutical Research .2020,10(1); 858-869.
13. DON Daniel nwibo, Mirabel ifeyinwa Eze and Thomas Mmuoemene Okonkwo. EFFECTS OF HIBISCUS ROSA- SINENSIS LEAFE PRODUCTS ON HEMATOLOGICAL INDICEES, LIPID AND HEPATIC
14. Aladekoyi, Gbenga, karimu A.O and Jida A.O. PHYSICO-CHEMICAL AND ANTIBACTERIAL EVALUATION OF OIL EXTRACTED FROM RIPE AND UNRIPE PAWPAW SEED (CARICA PAPAYA) Integrity Research Journals. 2016 1(1) ;10-14
15. Al snafi AE. CLINICAL TESTED MEDICINAL PLANT: A review(part1). SMU Medical journal 2016;3(1):98-128.
16. Al-snafi AE. Medicinal plants with cardiovascular effects (part2): plant-based review. IOSR Journal of pharmacy 2016;6(7):43-62.
17. Al-snafi AE. THERAPEUTIC PROPERTY OF MEDICINAL PLANTS; a review of their detoxification capacity and protective effect (part1). ASIAN JOURNAL OF PHARMACEUTICAL SCIENCE & TECHNOLOGY 2015;5(4):257-270.
18. Kailas K Mali, Guruprasad V SUTAR .Evaluation of Nootropic Activity of *Limonia acidissima Against Scopolamine*-induced Amnesiain Rats. Pharmaceutical science 2021;18(1):3-9.
19. Devkar Mohan j, Shaikh shahrukh , Formulation and Evaluation of Herbal Syrup.Asian Journal of pharmaceutical Research and Development 2021;9(3):16-22.
20. Dr.javesh K,PATIL, Dipali R, Formulation and evaluation of Herbal Syrup .WORLD JOURNAL OF PHARMACEUTICAL RESEARCH. 2019;8(6):1061-1067.