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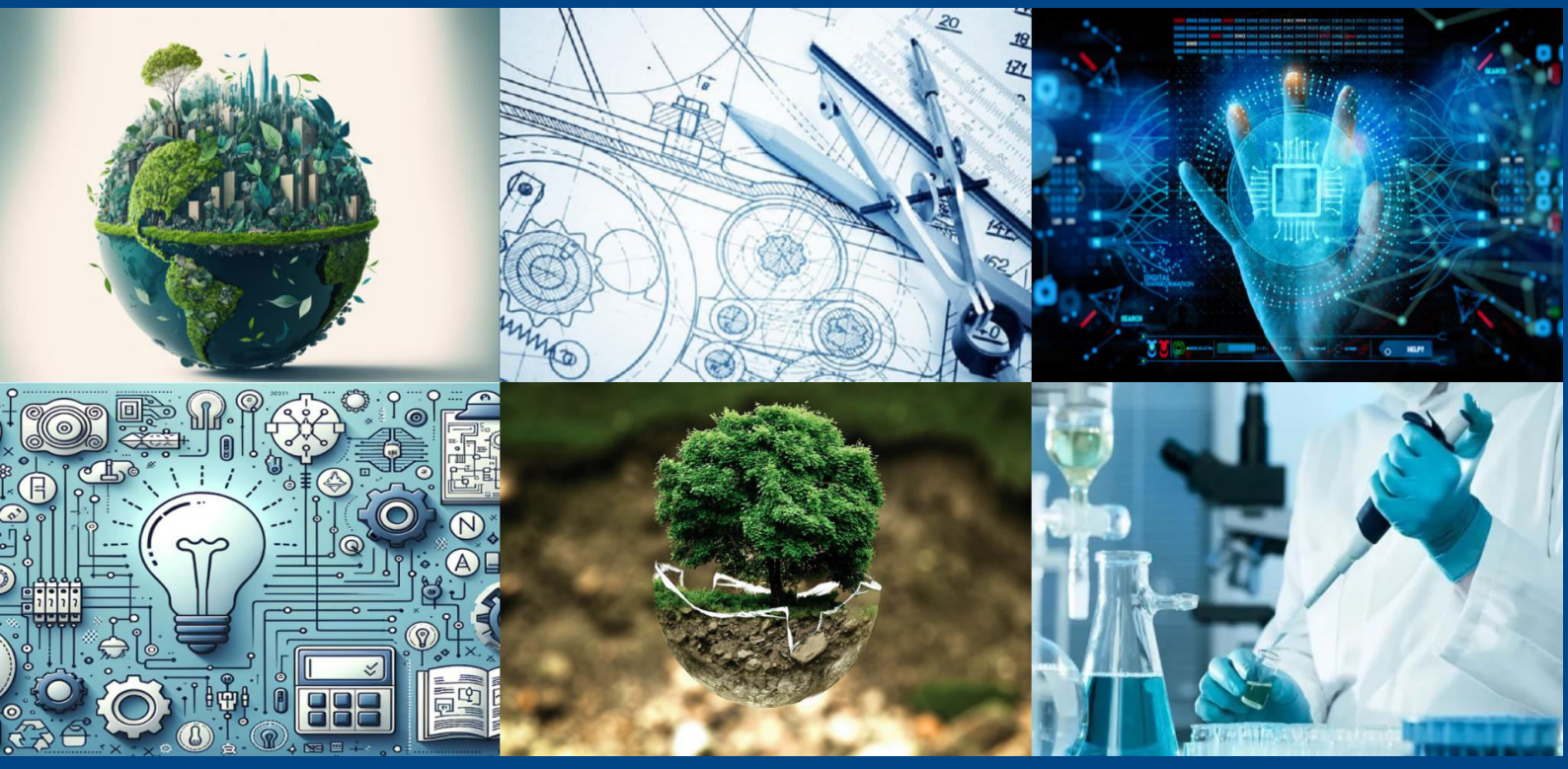

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Formulation and Evaluation of Madhuca Longifolia Extract Syrup for Nephrolithiasis

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ABSTRACT: Nephrolithiasis, commonly known as kidney stone disease, is a widespread urinary disorder characterized by the formation of crystalline stones in the kidneys due to supersaturation of minerals. Herbal medicines have gained increasing attention as safer alternatives to conventional therapies. Madhuca longifolia (Mahua), a traditionally used medicinal plant, possesses significant antiurolithiatic, anti-inflammatory, and diuretic properties.The present study focuses on the formulation and evaluation of a herbal syrup containing Madhuca longifolia extract for the management of nephrolithiasis. The extract was prepared using an appropriate extraction method (such as decoction or maceration) and incorporated into a syrup base with suitable excipients including sweetening agents, preservatives, and flavoring agents.

The formulated syrup was evaluated for various physicochemical parameters, including pH, viscosity, density, and stability, along with organoleptic properties such as color, taste, and clarity. Additionally, the formulation was assessed for antiurolithiatic activity, indicating its potential to inhibit stone formation and promote dissolution. The results demonstrated that the prepared syrup exhibited acceptable pharmaceutical characteristics, good stability, and promising therapeutic potential against kidney stones. Thus, Madhuca longifolia extract syrup can be considered a safe, effective, and economical herbal formulation for the management of nephrolithiasis.

KEYWORDS: Madhuca longifolia, herbal syrup, nephrolithiasis

I. INTRODUCTION

Nephrolithiasis is a medical condition in which solid crystals or stones form in the kidneys due to the accumulation of minerals and salts in urine. These stones can vary in size from very small particles to large stones and may move through the urinary tract, causing pain, obstruction, and urinary problems. The stones are usually formed when the urine becomes concentrated, allowing minerals such as calcium, oxalate, and uric acid to crystallize and stick together. If the stones move from the kidney into the ureter, they can cause severe pain known as renal colic. Nephrolithiasis is a common urinary system disorder and affects people of different ages, but it is more frequent in adults. Factors such as low water intake, dietary habits, genetic predisposition, infections, and metabolic disorders can increase the risk of stone formation.

Common types of kidney stones include: Calcium oxalate stones (most common) ,Uric acid stones, Struvite stones ,Cystine stones. Typical symptoms may include severe flank pain, blood in urine (hematuria), nausea, vomiting, and difficulty in urination.Early diagnosis and proper treatment such as increased fluid intake, medications, or medical procedures can help prevent complications and recurrence.

1.1Madhuca Longifolia

Madhuca longifolia is a large tropical tree belonging to the family Sapotaceae. It is commonly known as Mahua in India. This plant is widely distributed in the forests of India, especially in central and northern regions. It is an important medicinal and economic plant used in traditional medicine systems such as Ayurveda. The tree can grow up to 15–20 meters in height and produces fleshy flowers, seeds, and fruits that have many medicinal and nutritional uses. Different parts of the plant such as flowers, seeds, bark, and leaves are used for therapeutic purposes. The flowers of Madhuca longifolia are rich in sugars, vitamins, and minerals, while the seeds contain oil known as Mahua oil. In traditional medicine, the plant is used for treating conditions such as inflammation, skin diseases, diabetes, and kidney disorders. Because of its antioxidant, anti-inflammatory, antimicrobial, and diuretic properties, Madhuca longifolia is often used in herbal formulations, including syrups and extracts for the management of diseases like kidney stones (nephrolithiasis).

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1.2 Ethanopharmacological use

The tannin content of bark is 17% Rheumatism ulcers bleeding and spongy gums are All treated with bark. Inflammation sprains and pruritus are all treated effectively with the bark. The economic value of mahua seedas dreams from its usefulness as a food source. Chemical constituents Isolated and identified bioactive components in Madhuca leaves include- quercetin, 3-O-lrhamnosid,Stigmasterol,n-hexacosanol,carotene,myricitin ,erthrodiol ,sitosterol,3-caproxyolcan-12-en-28-ol,3-galactoside.

M.longifolia natural habitat spans from the southernmost tip of the konkan peninsula dow. To the Westernmost tip of the western ghats
Kingdom: plantae
Order: Ericaleae
Genus:madhuca

II. MATERIALS AND METHODS

2.1 Experimental requirements

Madhuca longifolia was obtained from Marotiya bazar,Indore. Methanol ,Propylene glycol,Methyl paraben, Propyl paraben,Saccharine, Sorbitol and Glycerine were also purchased from Marotiya bazar, Indore.

2.2. List of Equipment: Soxhlet apparatus,Ostwald viscometer, Sieve, pH meter, Mixer grinder, Heating mental

2.3 Preparation of formulation:

A) Extraction of plant: - The leaves and powder of madhuca longifolia were weighed and Extracted through Soxhlet process using methanol and water.After it was filtered with whatman Filter peper to get the extract in homogeneous manner.

B) Methanolic flower extract of madhuca longifolia:-Steps and procedures were same for flowers in methanol.it was also extracted in soxhlet In apparatus using distilled water. The following steps involved for the extraction of flowers of Smahua in methanolic solvent.

Fig. 1: Dry Flower of M. Longifolia **Fig. 2: Dry Powder of M. Longifolias**

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Fig. 3: Decotion method Fig. 4: Solubility of extract

C) Formulation of Syrup

The sugar foundation was made by boiling together 45 grammes of water and 45 grammes of sucrose. Distilled water was added to bring the total volume to 100 ml after the liquid was filtered. The preservatives were mixed into a sugar solution after being dissolved in a little amount of water that had been cooked and cooled. Glycerin and sorbitol were added to a solution of Madhuca longifolia extract powder soaked in propylene glycol at 45-50°C. All of the remaining sweeteners were added and blended together. If the pH is too high (above 6.5), use citric acid to lower it to 5.5. The remaining 25 ml were then reconstituted with cooled, boiling water.

Material	F1	F2	F3
M.Longifolia extract of flowers	1.0	0.5	0.25
Propylene glycol	6.0	3.0	1.5
Methyl paraben	0.25	0.12	0.06
Propyl peraben	0.25	0.12	0.6
Saccharine	0.25	0.12	0.6
Sorbitol	2.0	1.0	0.5
Glycerine	0.5	0.25	0.12

Table No.1: Formulation of M.longifolia syrup

2.4 Evaluation parameters of herbal syrup

2.4.1 Organoleptics property

The prepared syrup will be examined for their appearance color odor and taste

2.4.2 Flavonoids test

1ml plant extracts has been taken in to test tune +2ml of 1% sodium hydroxide+(NaoH)

Solution has been added in the test tube. The presence of yellow colour is the sign that it contains flavonoids

2.4.3 Determination of ph

The pH of the syrup is determined by using digital photo meter, the measurements of ph of each syrup is done in triplicate and values were noted

2.4.4 Solubility

To check the solubility of the prepared syrup in different solvent shown in fig.no.8

2.4.5 Determination of density

The following steps are followed in determination of density. The specific gravity bottle can be completed cleaned using chronic acid or nitric acid.

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2.4.6 Viscosity

The viscosity was estimated by following steps of procedure use heated chronic acid or an organic solvent like acetone to thoroughly clean the ostwald viscometer

2.4.7 Stability study

Three months of storage at 40 2°C and 75 5% RH are used to evaluate the stability of the final syrup formulation. The sample were analysed at 0.7.14.and 21 days for things like colour smell and taste

III. RESULTS AND DISCUSSION

Evaluation parameters

Features	F1	F2	F3
Colour	Pale yellow	Pale yellow	Pale yellow
Odor	Characteristics	Characteristics	Characteristics
Test	Sweet	Sweet	Sweet

Table No 2. Organoleptic characteristics features of syrup

Fig.No.5: Estimation of Ph

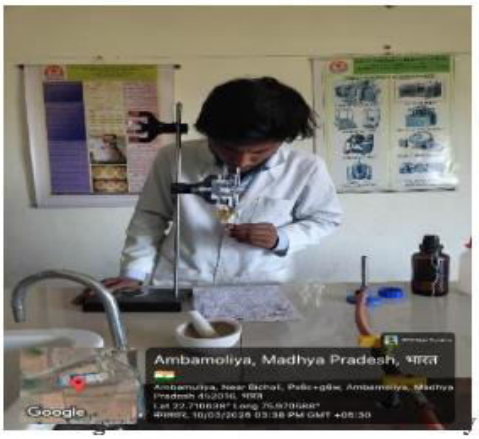

Fig.No.6: Determination of viscosity

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Fig.No.7: Determination of density

Fig.No.8: Solubility test

Features	F1	F2	F3
Ph	6.5	6.45	6.73
Solubility	Soluble in methanol and water	Soluble in methanol and water	Soluble in methanol and water
Density	0.82g	0.84g	0.79g
Viscosity	3.64cp	3.62cp	3.66cp

Table No.3. Estimation of pH, solubility, Density & Viscosity

IV. SUMMARY

Nephrolithiasis (kidney stone disease) is a condition in which hard crystalline stones form in the kidneys due to the accumulation of minerals such as calcium, oxalate, uric acid, or cystine in urine. These stones develop when urine becomes highly concentrated and the minerals crystallize and stick together.

Common symptoms include severe pain in the lower back or abdomen, painful urination, blood in urine,nausea, and frequent urination. Diagnosis is usually done by urine tests, blood tests, ultrasound, or CT scan. Treatment depends on the size of the stone and may include increased fluid intake, medications, shock wave therapy (lithotripsy), or surgery. Preventive measures include drinking plenty of water, maintaining a balanced diet, and reducing excessive salt and oxalate intake.

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Madhuca longifolia

Madhuca longifolia is a medicinal tree commonly known as Mahua, widely found in India. Different parts of the plant such as leaves, bark, flowers, and seeds are used in traditional medicine.

The plant contains bioactive compounds like flavonoids, saponins, tannins, and triterpenoids, which provide several pharmacological activities such as anti-inflammatory, antioxidant, antimicrobial, and diuretic effects.

In the treatment of nephrolithiasis, Madhuca longifolia extracts are believed to help reduce kidney stoneformation, promote urine flow (diuretic action), and help dissolve or prevent the aggregation of crystals in the urinary tract. Because of these properties, it is often used in herbal formulations and syrups for kidney stone management.

V. CONCLUSION

Nephrolithiasis is a common urinary disorder characterized by the formation of stones in the kidneys due to the accumulation and crystallization of minerals in urine. It can cause severe pain and urinary complications if not treated properly. Herbal medicines play an important role in its management.Madhuca longifolia possesses various pharmacological properties such as diuretic, anti-inflammatory, and antioxidant activities, which may help in reducing the formation of kidney stones and promoting their elimination from the body. Therefore, the use of Madhuca longifolia in herbal formulations like syrups can be considered a beneficial and natural approach for the management of nephrolithiasis.

REFERENCES

1. Kokate C.K., Purohit A.P., Gokhale S.B. Pharmacognosy. Nirali Prakashan, Pune.
2. Khandelwal K.R. Practical Pharmacognosy: Techniques and Experiments. Nirali Prakashan.
3. Trease G.E., Evans W.C. Trease and Evans Pharmacognosy. 16th Edition, Saunders Elsevier.
4. Bruneton J. Pharmacognosy, Phytochemistry and Medicinal Plants. Lavoisier Publishing, Paris.
5. Harborne J.B. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. Chapman and Hall.
6. Goodman & Gilman. The Pharmacological Basis of Therapeutics. McGraw-Hill Publication.
7. Research Article:
8. Phytochemical and pharmacological review on Madhuca longifolia. International Journal of Pharmaceutical Sciences and Research.
9. Pal SK, Shukla SK, Verma S, Pratap S. Formulation and Evaluation of Madhuca longifolia Extract Syrup for Lithiasis. International Journal of Pharmaceutical Sciences and Medicine. 2023;8(7):1-20.
10. Dubey I, Singh V, Mishra A. Botanical and Pharmacological Review of Madhuca longifolia. Pharmacognosy Reviews. 2023;17(34):85-92.
11. Shukla S, Verma P, Wal P. Comprehensive Evaluation of Madhuca longifolia: Morphological, Phytochemical and Pharmacological Aspects. Library Progress International. 2024;44(2):115-122.
12. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 56th ed. Pune: Nirali Prakashan; 2019.
13. Khandelwal KR. Practical Pharmacognosy: Techniques and Experiments. 23rd ed. Pune: Nirali Prakashan; 2015.
14. Harborne JB. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. London: Chapman and Hall; 1998.
15. Evans WC. Trease and Evans Pharmacognosy. 16th ed. London: Saunders Elsevier; 2009.
16. Indian Pharmacopoeia Commission. Indian Pharmacopoeia. Ghaziabad: IPC; 2018.
17. Rang HP, Dale MM, Ritter JM, Flower RJ. Rang and Dale's Pharmacology. 8th ed. London: Elsevier; 2016.

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