INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

A Review on Medicinal Plants Used in Treatment of Kidney Stone

Abhishek Gaikwad*, Kalyani Deshmukh, Apeksha Fulsundar, Viraj Shelke

Vidyaniketan Institute of Pharmacy and Research Centre, Bota, India

ARTICLE INFO

Published: 13 Dec 2025
Keywords:
Kidney stone, medicinal plants, etc.
DOI:
10.5281/zenodo.17915578

ABSTRACT

Kidney stones, also called nephrolithiasis, affect many people today because of how lifestyles have changed. In the last ten years, there has been renewed interest in studying medicinal plants as a possible source of natural remedies. Herbal medicine might become an important part of the medical system for treating diseases in the coming years. Many studies show that using medicinal herbs could be a helpful way to treat kidney stones. Plants contain different active substances, like polyphenols, flavonoids, saponins, furanochromones, alkaloids, and terpenoids, which might help stop kidney stones from forming. These natural resources have a variety of active compounds, including phenolic acids, flavonoids, and terpenoids, which have been found to have strong potential in preventing kidney stones. However, most of the studies on these natural substances are still in early stages. Future research, especially in clinical settings, could help prove how effective these treatments might be in real-world situations.

INTRODUCTION

Kidney stones are a health problem that affects people of all genders, races, and ages. It is thought that this condition is becoming more common in many parts of the world. Along with the effects of global warming, how people eat may be a big reason for this increase. About 12% of people around the world will develop kidney stones at some point in their lives. Having kidney stones can increase the chances of getting chronic kidney disease by 60% and end-stage kidney disease by 40%. It has also been linked to a type of kidney cancer called papillary renal cell carcinoma. In recent times, there has been more interest in using herbal products because of the high cost and side effects of surgeries and medical procedures.

For a long time, people and animals have used medicinal plants as a main source of food and medicine. Today, many researchers are studying natural resources like herbs and old techniques used by people like Ibn Sina . Medicinal plants can help ease the pain from kidney stones and

***Corresponding Author:** Abhishek Gaikwad
Address: *Vidyaniketan Institute of Pharmacy and Research Centre, Bota, India*
Email : gaikwadabhishek590@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

stop the formation of new ones. They can also help remove stones from the kidneys. These plants are used to treat different types of kidney stones, including calcium oxalate, uric acid, struvite, and cysteine. The use of herbal medicine is part of the development of modern society .

Causes of Kidney Stone

Kidney stones happen when the body doesn't make enough urine to wash away minerals, which then turn into crystals. Some main reasons for this include not drinking enough water, eating too much salt, being overweight, and having certain health issues like gout, inflammatory bowel disease, or urinary tract infections. Also, eating too much meat, foods high in oxalates, and some types of supplements can lead to kidney stones.

- Dehydration
- High sodium diet
- Obesity
- Dietary excess
- Gout
- UTI's
- Diabetes

Symptoms of Kidney Stone

A kidney stone often doesn't cause any pain until it moves inside the kidney or travels into one of the ureters. The ureters are the tubes that carry urine from the kidneys to the bladder. If a kidney stone gets stuck in a ureter, it can block the urine flow.

This can make the kidney swell and cause the ureter to tighten. This can be really painful. When this happens, you might feel:

- A severe, sudden pain on the side and back, just below the ribs.
- Pain that moves to the lower belly and groin area.
- Pain that comes in waves and changes in how strong it feels.
- A burning or painful feeling when you urinate.
- Urine that looks pink, red, or brown.
- Urine that is cloudy or has a bad smell.
- A strong need to urinate, going more often than usual, or urinating small amounts.
- A stomachache or feeling sick and throwing up.
- Fever and shivering if there's an infection.

The pain from a kidney stone can change as the stone moves through your urinary system. For example, the pain may move to a different part of your body or get worse.

Pathophysiology of Kidney Stone :

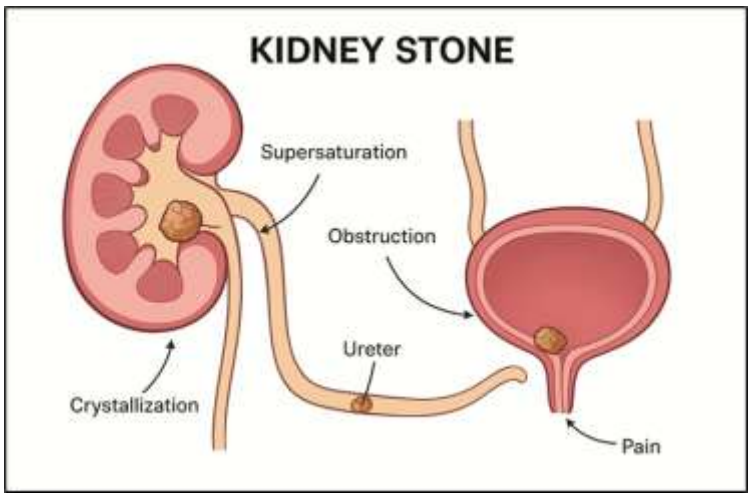

Fig. Pathophysiology of Kidney Stone

Stone growth starts with the formation of crystals in supersaturated urine which then adhere to the urothelium, thus creating the nidus for subsequent stone growth. The biological processes that anchor crystals to the urothelium are incompletely understood. Many, but not all, calcium oxalate stones develop on Randall's plaques which are composed of calcium phosphate (= hydroxyapatite) crystals. These grow to erode the urothelium, forming a nucleus for calcium oxalate deposition.

More recent ideas look at how certain molecules on the surface of cells can either help or stop crystals from sticking. When the lining of the urinary tract gets damaged and heals after a stone forms, these molecules may appear more on the cell surface, making it easier for new crystals to stick. This is why it's said that a stones beget stones because there might be a leftover piece of a stone that can help form new ones, and/or these molecules may increase to make crystal sticking more likely. Preventing stones involves finding and reducing the factors that lead to crystal formation.

Some things, like not producing enough urine, having less citrate in the urine, or having urine that is too acidic, can help this happen. Also, stones can form around things like organic material.

Stages of Kidney Stones :

- **Supersaturation :** The first step in making a kidney stone is called the supersaturation stage. During this time, the amount of minerals like calcium, oxalate, and uric acid in the urine becomes too high. These minerals dissolve in the urine, but when there's too much, they can't stay dissolved anymore. This makes the urine unstable, and the extra minerals start to come out of the liquid, forming tiny crystals. This is the beginning of a kidney stone forming. Supersaturation occurs due to a high concentration of stone-forming substances and/or low urine volume (dehydration), the concentration of these solutes becomes so high that if more were to dissolve, they would immediately crystallize out of the solution.

- **Nucleation :** The first step in forming a kidney stone is called nucleation, where ions in the urine start to come together to make a small, stable starting point for a crystal. This can happen in two main ways: one is when ions join on their own in a very concentrated urine, and the other is when they stick to

existing particles like cells, proteins, or other tiny crystals. Once this small starting point forms, more ions can attach to it, causing the crystal to grow larger.

- **Crystal growth :** The crystal growth stage of kidney stone formation occurs after supersaturation and nucleation, where individual crystals combine and increase in size by adding more mineral components to their surface.
  This growth is a slow process driven by the aggregation of smaller crystals or secondary nucleation on the surface of an existing crystal. Factors like urinary pH, promoters, and inhibitors influence the rate of this growth.

- **Crystal retention :** The crystal retention stage happens when tiny crystals formed in urine get stuck in the kidney or the tubes that collect urine. Once they stay in place, they can't be washed out and start to get bigger. These crystals might stick together or attach to the walls of the kidney tubes. This can happen because of certain biological factors or specific materials in the body, like Randall's plaques. This stage is important because it's the first step that leads to stones becoming large enough to cause problems. It's not just about the crystals being passed in urine, but also how they stick in the kidney.

- **Obstruction and clinical symptoms :** The symptoms a person has from a kidney stone mostly depend on if the stone is blocking the urinary tract and where the blockage is. If the stone is small and not causing a blockage, it might not cause any pain or problems. But if the stone is bigger or if it moves, it can lead to very severe pain and other serious health issues.

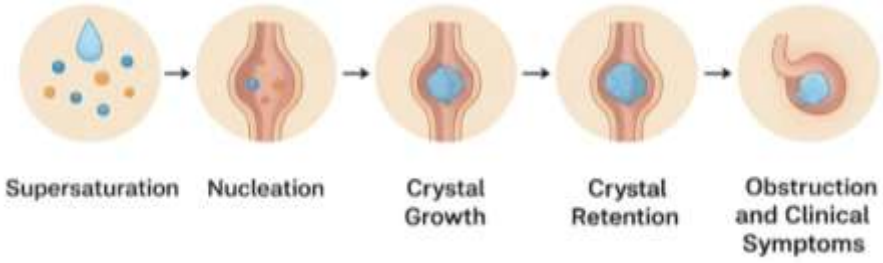

Fig. Stages of Kidney Stone

Plants used in treatment of kidney stone :

Sr. No.	Plant Name	Family	Part Used	Extracts	Active Constituents
1.	Kurdu	Amaranthaceae	Roots and Seeds	Ethanolic	Flavonoids, saponins, phenols, peptides.
2.	Punica granatum	Lythraceae	Fruits and Bark	Aqueous	Polyphenols, flavonoids, tannins.
3.	Nigella sativa	Ranunculaceae	Seeds	Ethanolic	Proteins, saponins, alkaloids, fatty acids.
4.	Crateva nurvala	Capparaceae	Bark and Stem	Ethanolic	Flavonoids, steroids, fatty acids, amides.
5.	Cynodon dactylon	Poaceae	Rhizomes and Roots	Juice and hydroalcoholic	Triterpenoids, alkaloids, glycosides, essential oils.

6.	Petroselinum crispum	Apiaceae	Leaves, seeds and roots	Ethanolic and aqueous	Essential oil, flavonoids, vitamins.
7.	Aerva lanata	Amaranthaceae	Leaves, flowers and roots	Ethanolic and aqueous	Flavonoids and Alkaloids.
8.	Visnaga daucoides	Apiaceae	Fruits	Aqueous	Flavonoids and essential oils.
9.	Asparagus racemosus	Asparagaceae	Roots	Ethanolic and aqueous	Polysaccharides and mucilage.
10.	Lablab purpureus	Fabaceae	Seeds and leaves	Methanolic and aqueous	Flavonoids, saponins, tannins, and alkaloids.
11.	Origanum vulgare	Lamiaceae	Leaves, flowers and stem	Aqueous and methanolic	Flavonoids, polyphenols and sterols.
12.	Pistacia lentiscus	Anacardiaceae	Leaves	Aqueous and ethanolic	Fatty acids, steroids, and volatile oils.
13.	Rubus idaeus	Rosaceae	Young roots	Aqueous	Flavonoids, vitamins and fatty acids.
14.	Rubia cordifolia	Rubiaceae	Roots	Hydroalcoholic and ethanolic	Terpenoids and glycosides.
15.	Solanum virginianum	Solanaceae	Fruits and roots	Ethanolic and methanolic	Alkaloids, fatty acids and flavonoids.

CONCLUSION

Medicinal plants provide a natural, affordable way to help manage kidney stones. They work by helping the body pass more urine, reducing harmful chemicals, and stopping stones from forming. Some plant-based treatments may also help break down stones and lower the chance of them coming back, with fewer side effects than usual medical treatments. But more research is needed to make sure these plants are safe, work well, and are used correctly. In general, using medicinal plants can be a helpful addition to treating and preventing kidney stones.

REFERENCES

1. Akram, M., & Idrees, M. (2019). Progress and prospects in the management of kidney stones and developments in phyto-therapeutic modalities. International Journal of Immunopathology and Pharmacology.
2. Rasool, M., Mousa, T., Alhamadani, H., & Ismael, A. (2022). Therapeutic potential of medicinal plants for the management of renal stones: A review. Baghdad Journal of Biochemistry and Applied Biological Sciences, 3(02), 69–98.
3. Akram, M. (2019). Nephrolithiasis; Prevalence, Risk factors and Therapeutic Strategies: A Review. Madridge Journal of Internal and Emergency Medicine, 3(1), 90–95.
4. Malabadi, R. B., Meti, N. T., & Chalannavar, R. K. (2021). Updates on herbal remedy for kidney stone chronic disease. International Journal of Research and Scientific Innovation, 8(2), 2321–2705.
5. Shahsavari, S. (2021). An Overview of the Most Important Medicinal Plants Used in Iranian Traditional Medicine for the Treatment of Kidney Stones: A mini-review article. Plant Biotechnology Persa, 3(1), 0–0.
6. Anand, D., R, C., & B, S. (2021). A Critical Review on Antiurolithiatic Activity of Bioactive Phytoconstituents. Research Journal of Pharmacognosy and Phytochemistry, 95–100.

7. Arya, P. (2017). KIDNEY STONES FORMATION AND USE OF MEDICINAL PLANTS AS ANTIUROLITHIATIC AGENTS. Universal Journal of Pharmaceutical Research, 2(4), 42–48.
8. Kasote, D. M., Jagtap, S. D., Thapa, D., Khyade, M. S., & Russell, W. R. (2017, May 5). Herbal remedies for urinary stones used in India and China: A review. Journal of Ethnopharmacology.
9. Pascoa Júnior, J. G. de, & Souza, C. L. L. de. (2021). Medicinal plants used in the Amazon region: a systematic review. Research, Society and Development, 10(14), e163101419965.
10. Al-Mamoori, F., Al-Samydai, A., & Aburjai, T. (2019). Medicinal plants for the prevention and management of nephrolithiasis: A review. International Journal of Scientific and Technology Research, 8(11), 2700–2705.
11. Moradi, M. T., & Asadi- Samani, M. (2016). Traditionally used Medicinal Plants in the Treatment of Kidney Stone: a Review on Ethnobotanical Studies in Iran. AMBIENT SCIENCE, 3(2/spl).
12. Alok, S., Jain, S. K., Verma, A., Kumar, M., & Sabharwal, M. (2013). Pathophysiology of kidney, gallbladder and urinary stones treatment with herbal and allopathic medicine: A review. Asian Pacific Journal of Tropical Disease, 3(6), 496–504.
13. Manjiri, M. A., Asadpour, A. A., Yousefi, M., Ghazanfari, S. M., & Salari, R. (2022). Dolichos biflorus, Useful Food for Patients with Kidney Stones. Current Traditional Medicine, 9(2).
14. Priya S Arul, S. V. (2020). Anti - Urolithiatic activity of medicinal plants and Siddha formulatory medicine : - A Review. Journal of Research in Biomedical Sciences, 3(1), 7–12.
15. Ibrahim, S. R. M., Bagalagel, A. A., Diri, R. M., Noor, A. O., Bakhsh, H. T., & Mohamed, G. A. (2022). Camphorweed (Pluchea indica): A Multi-Potential Medicinal. Molecules, 27(2383), 1–49.
16. Kumar Shukla, A., Shukla, S., Garg, A., Garg, S., & shukla, A. (2017). A Review On Anti-Urolithiatic Activity Of Herbal Folk Plants. Asian Journal of Biomaterial Research, 3(32), 1–11.
17. Panigrah, P. N., Dey, S., & Jena, S. C. (2016). Urolithiasis: Critical analysis of mechanism of renal stone formation and use of medicinal plants as antiurolithiatic agents. Asian Journal of Animal and Veterinary Advances. Academic Journals Inc.
18. Koay, Y. C., & Amir, F. (2012). a Survey of the Chemical Constituents and. Sci..Int., 24(2), 133–138.
19. Zakaria, N. H., Majid, F. A. A., Helmi, N. A. N. M., Fadhlina, A., & Sheikh, H. I. (2023, December 1). Medicinal Potentials of Strobilanthes crispus (L.) and Orthosiphon stamineus Benth. in the Management of Kidney Stones: A Review and Bibliometric Analysis. Journal of Herbal Medicine.
20. Mohapatra, P., Sharma, A., & Dixit, Dr. Y. (2020). A REVIEW ON PHYTO CHEMICALS AND MEDICINAL PROPRTIESOF BOMBAX AND PHYLLANTHUS SPECIES. International Journal of Engineering Applied Sciences and Technology, 5(1), 522–530.
21. Singla, R. K., & Nagal, A. (2013). Herbal Resources with Antiurolithiatic Effects: A Review. Indo Global Journal of Pharmaceutical Sciences, 3(1), 6–14.
22. Mohsenzadeh, A., Ahmadipour, S., Ahmadipour, S., & Eftekhari, Z. (2015). A review of medicinal herbs affects the kidney and bladder stones of children and adults in traditional medicine and ethno-botany of Iran. Der Pharmacia Lettre, 7(12), 279–284.

23. Augusto Scardelato, J., Pella Legramandi, V. H., & do Sacramento, L. V. S. (2013). Occurrence of crystals in medicinal herbs for the treatment of nephrolithiasis: A paradox? Revista de Ciencias Farmaceuticas Basica e Aplicada, 34(2).
24. Kain, D., Kumar, S., & Suryavanshi, A. (2018, December 1). Therapeutic values of medicinal plants against prevalence of urolithiasis: A review. Medicinal Plants.
25. Tuta-Quintero, E., Martínez-Lozano, J. C., Briceño-Balcázar, I., Guerron-Gómez, G., & Gómez-Gutiérrez, A. (2021). Management of "stone pain" between the 18th and 19th centuries: A brief history of a medical prescription in the Viceroyalty of New Granada. Actas Urologicas Espanolas, 45(7), 507–511.

HOW TO CITE: Abhishek Gaikwad, Kalyani Deshmukh, Apeksha Fulsundar, Viraj Shelke, A Review on Medicinal Plants Used in Treatment of Kidney Stone, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 12, 2197-2203. https://doi.org/10.5281/zenodo.17915578